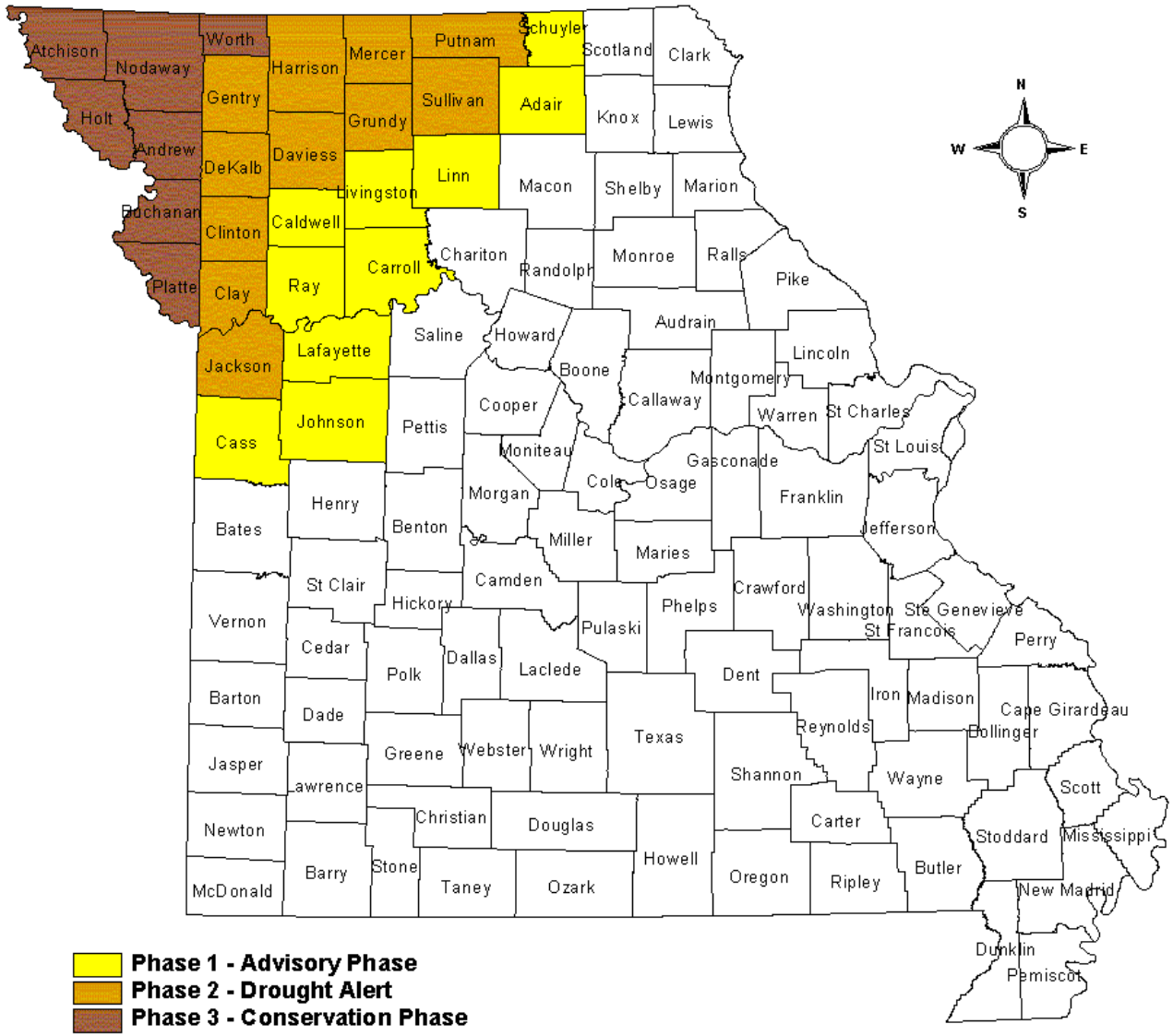
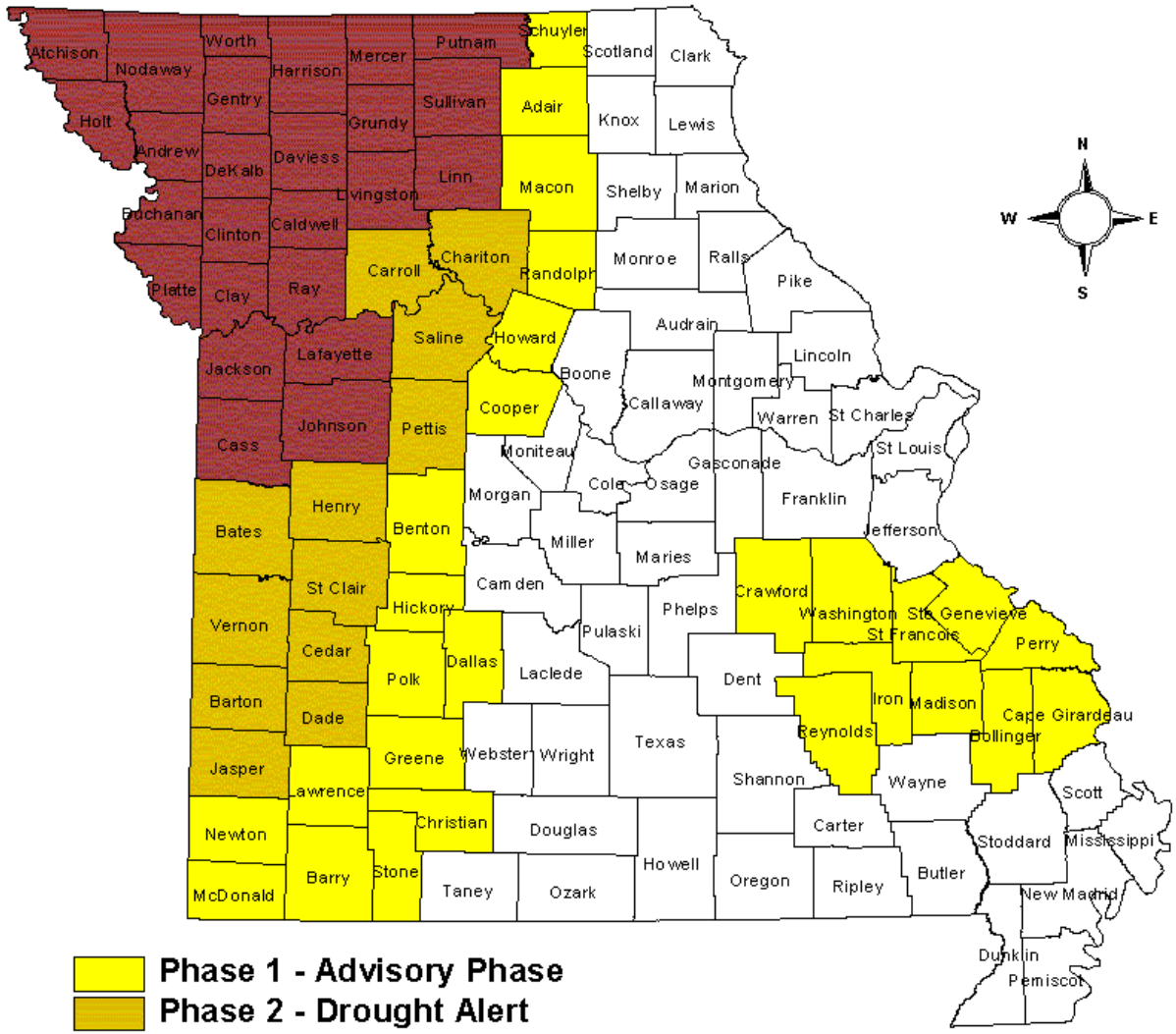
The Geological Survey and Resource Assessment Division

Department of Natural Resources

Drought Condition Status (August 13, 2002)

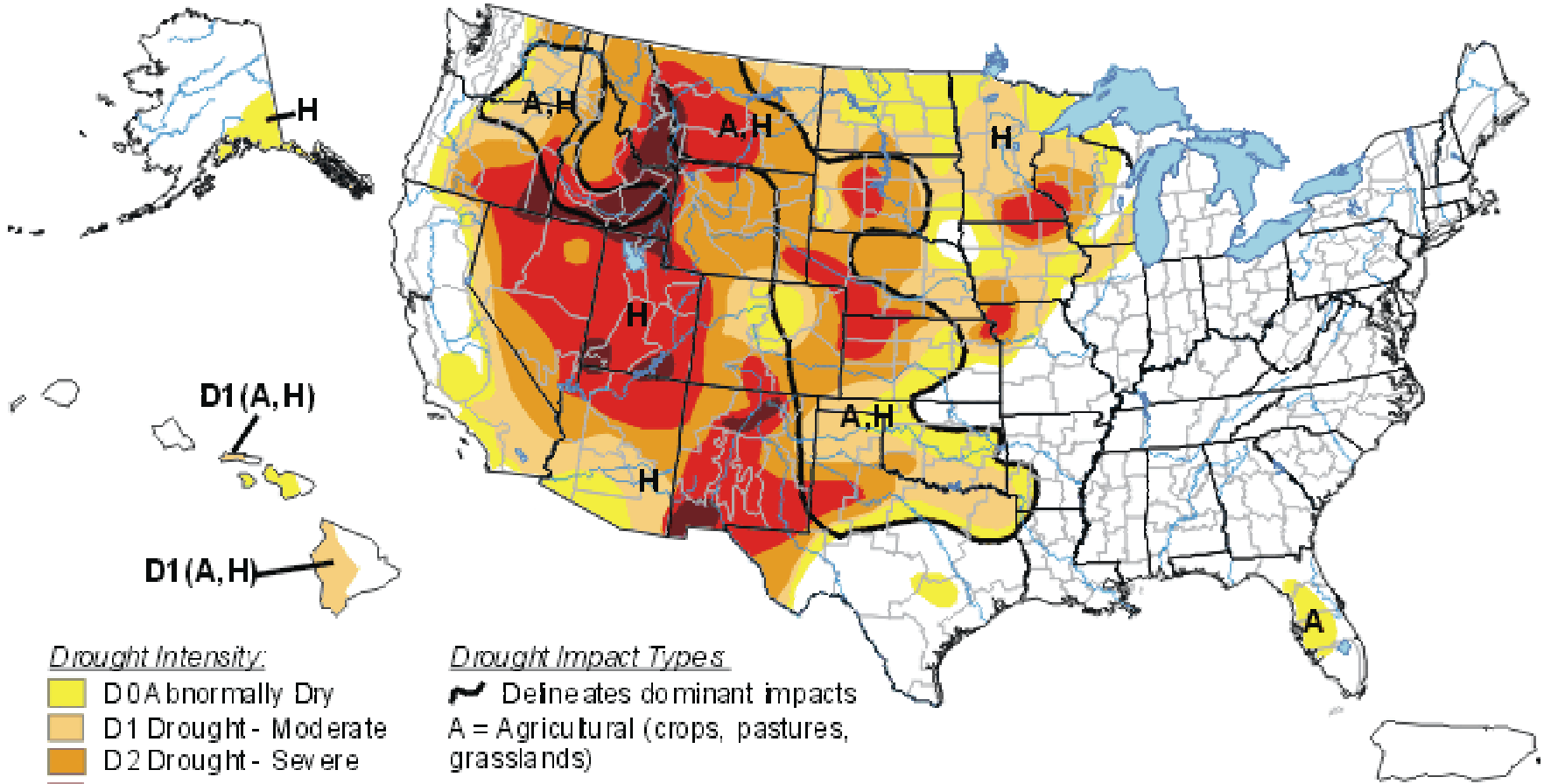


Drought Condition Status (November 13, 2003)



U.S. Drought Monitor

December 9, 2003
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)
(No type = Both impacts)

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

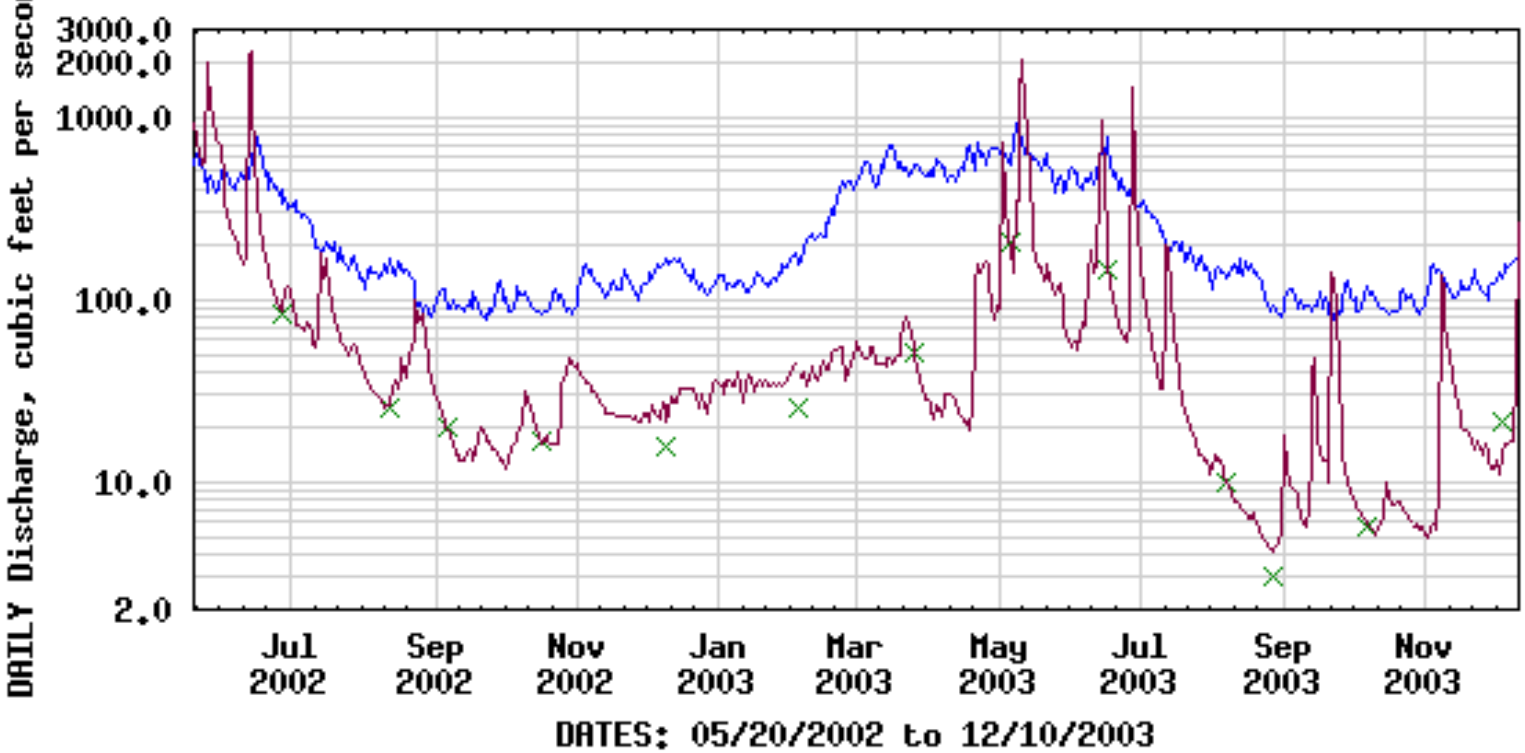
http://drought.unl.edu/dm

Released Thursday, December 11, 2003

Author: David Miskus, JAWF/CPC/NOAA

USGS

USGS 06897500 Grand River near Gallatin, MO



EXPLANATION

— MEDIAN DAILY STREAMFLOW BASED ON 82 YEARS OF RECORD

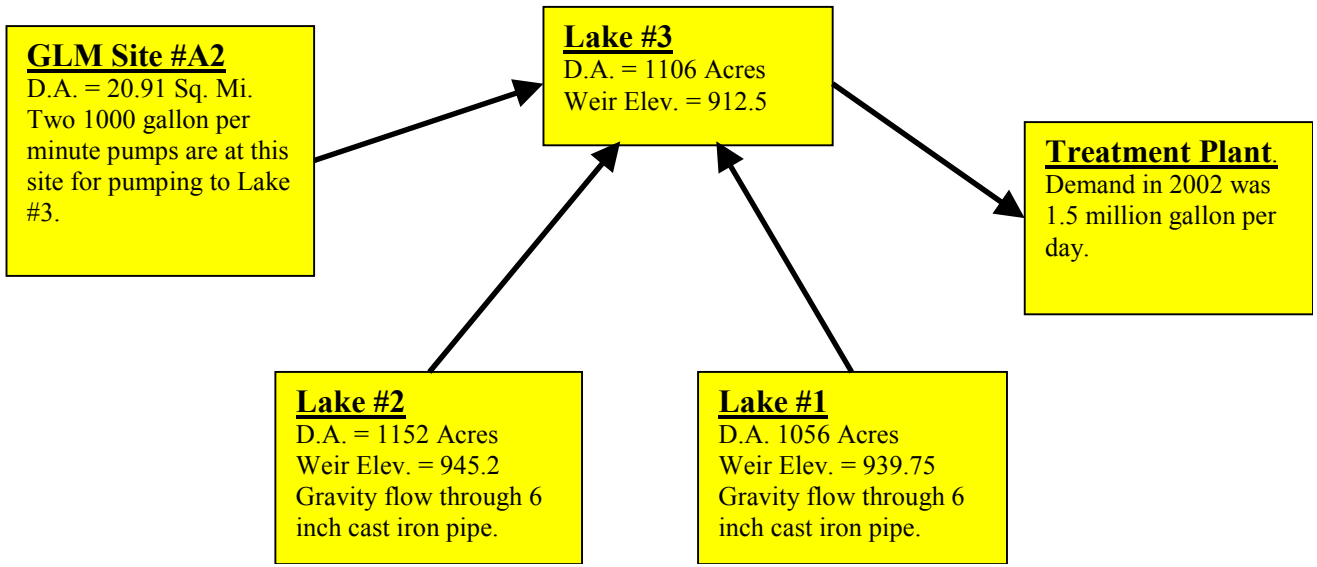
× MEASURED Discharge

— DAILY MEAN DISCHARGE

Provisional Data Subject to Revision

CAMERON, MISSOURI
DISTRIBUTION AND WATER USE SCHEME

April 2003



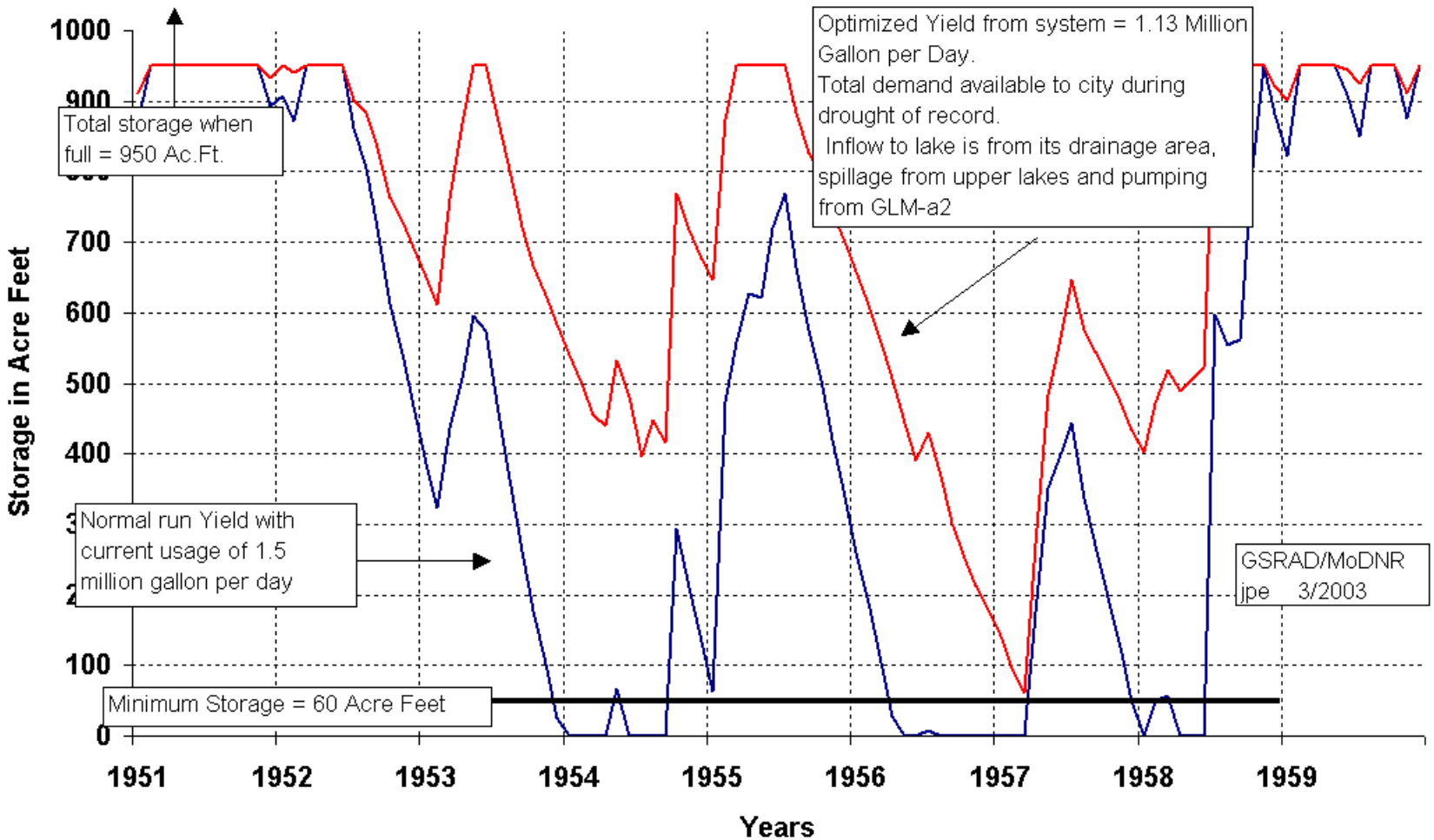
Option Button 13

Cameron, Missouri

Lake Number 3

Reservoir analysis during the 1950's Drought

Missouri Water Supply Analysis



Cameron - GLM Raised 3 feet

Grindstone Dam Spillway

Intake of Grindstone Lake

Cameron, Missouri **Nov. 2003**
Water supply Study
Assuming the GLM Site A2 to be raised three feet.

Purpose of Analysis:

To Determine effects of raising available storage in the GLM reservoir three feet.

Investigation, Analysis and Conclusions:

The system operation pumps water from Lake #3 into the treatment plant. Lake #3 inflow is spillage from lakes #1 and #2 and pumping from Grindstone Lake (GLM-A2).

This analysis raises the water elevation of the municipal pool in the Grindstone Lake by three feet, to elevation 900.1 feet. This increased the water supply by 561 acre feet. The cities water storage increased from 1300 acre feet to 1861 acre feet.

The drought of the 1950's is the drought of record. All data shown in the investigation and analysis report applies except the maximum storage was increased. See file "Investigation & Analysis.xls"

The average daily demand of 1.5 MGD was used.
See file "Historical Water use.xls" (Figure 1)

Storage data is shown in figures 2a and 2b. Figure 2a shows the storage to the top of Grindstone dam and 2b shows storage up to the proposed municipal pool. There was no change to Reservoir Number 3.
See files: "GLM-A2-Stor.xls(Stor)" for figure 2a.
"GLM-A2-Stor.xls(Low Stor)" for figure 2b.
"Stor-3lakes.xls(Res#3 Stor" for figure 3.

Figure 4 shows the storage after the RESOP analysis in Grindstone Lake. This analysis assumes that the entire demand of 1.5 MGD comes from this lake. The result shows that this lake alone could not sustain 1.5 MGD in late 1956 and early 1957. See File "GLM-norm.xls"

Figure 5 is remaining storage in lake #3, assuming that all the 1.5 MGD demand comes from this lake. Results show that demand could never be met. See file "Old Lake #3.xls"

Figure 6 Is the analysis of Grindstone Lake supplying water to lake #3 with one 1000 GPM pump to keep the water level in lake #3 near full.
Annual pumped volume from Grindstone Lake for this analysis is:

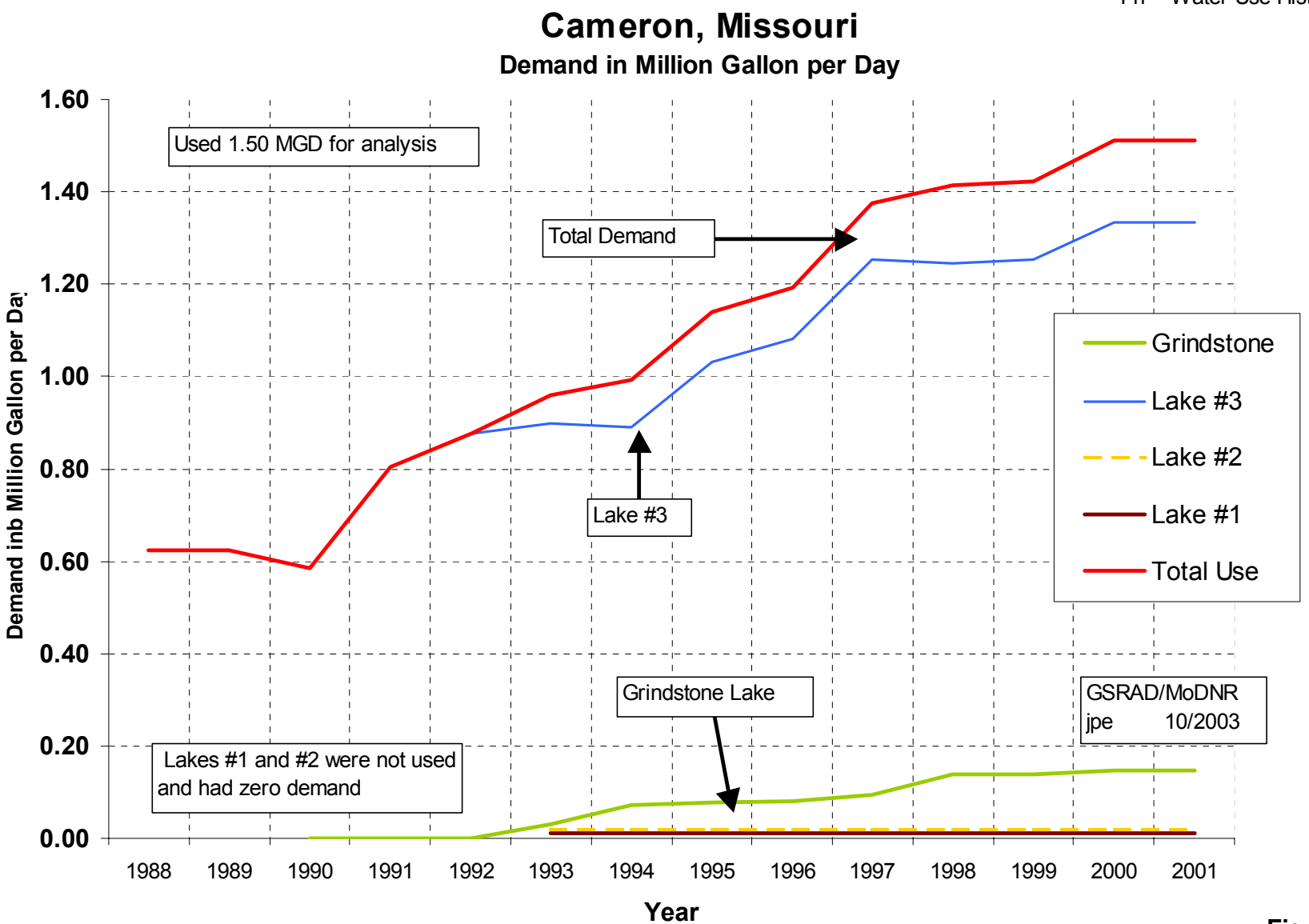
1951….	0.	Acre Feet
1952….	775.	Acre Feet
1953….	1013.	Acre Feet
1954….	1610.	Acre Feet
1955….	812.	Acre Feet
1956….	1391.	Acre Feet
1957….	812.	Acre Feet
1958….	949.	Acre Feet
1959….	0.	Acre Feet

See File: "GLM raised 3ft.xls"

Cameron, Missouri **Nov. 2003**
Water supply Study
Assuming the GLM Site A2 to be raised three feet.

Figure 7 is the analysis of lake #3 with a demand of 1.5 MGD and receiving the above listed water from the Grindstone Lake. No water was used from lakes #1 and #2. The result is the water level would drop below the 100 acre feet level that water could be safely taken for one month by about 70 acre feet. This amount of water could be taken from either lake #1 or #2. It could also be taken from Grindstone Lake sediment pool. The sediment pool has approximately 569 acre feet of storage. See File “lake #3 with GLM raised 3”.

Fn = Water Use Hist



Figu

Cameron, Missouri

fn = Stor-GLM-A2.xls(Stor Low)

Water supply analysis
Grindstone Lost Muddy Watershed Site A2

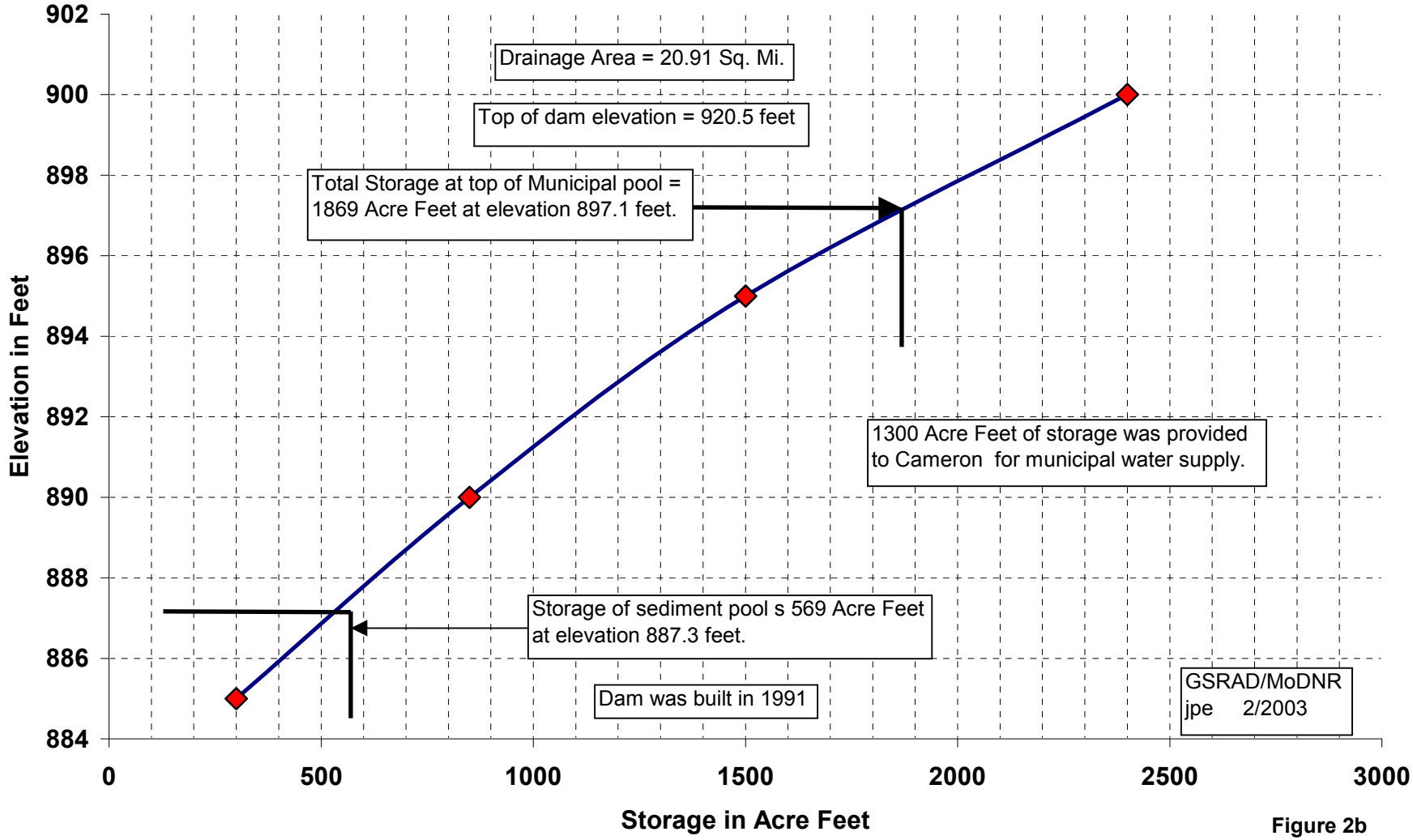


Figure 2b

Cameron, Missouri

Fn = Stor-3lakes.xls(Res#3 Stor)

Reservoir No. 3
Location - SE, SE, NE Sec. 9, T57N, R30W
Weir Elevation = 912.5

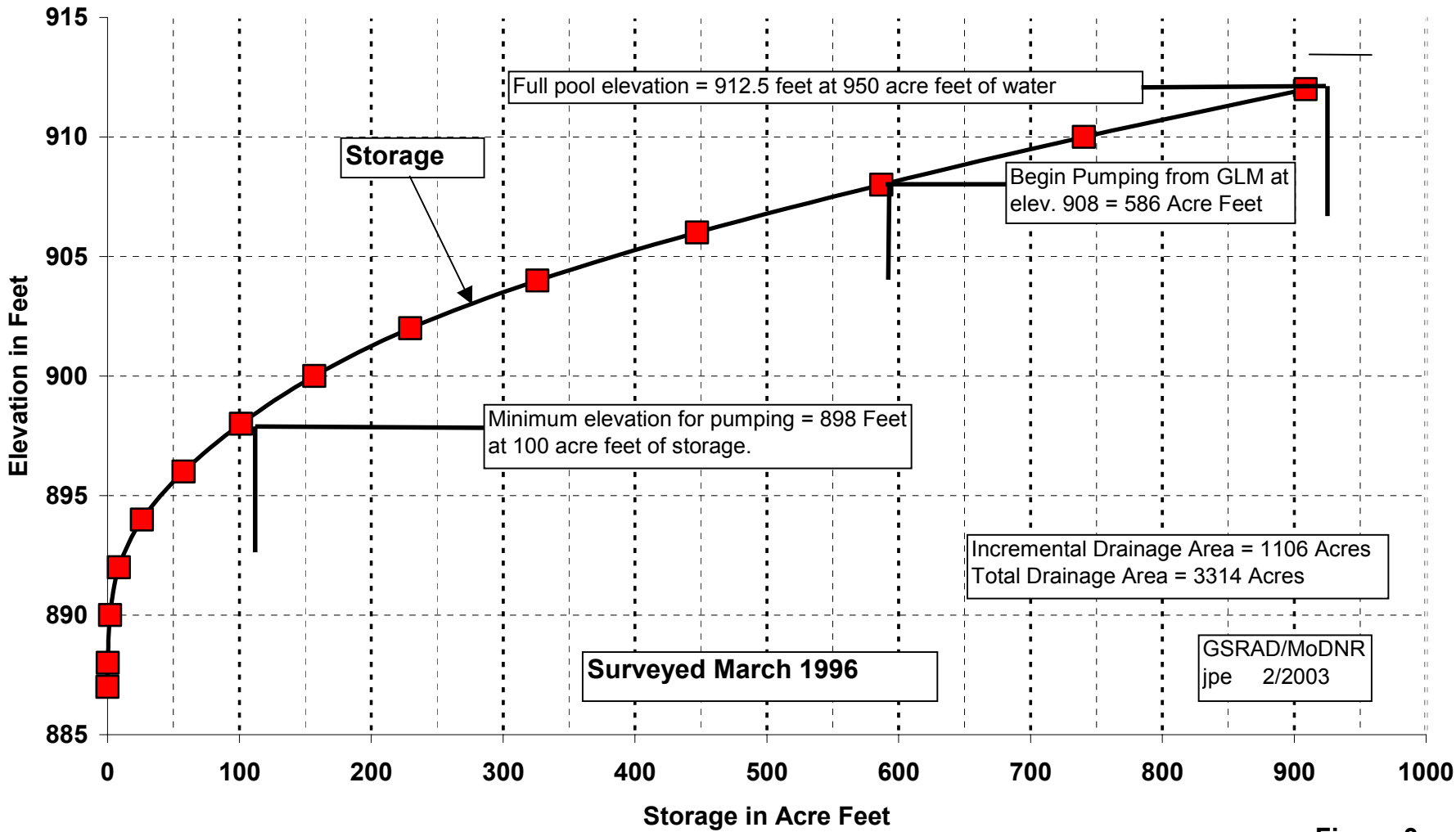


Figure 3

Fn = Old Lake #3.xls

Cameron, Missouri

Reservoir #3

No Inflow from GLM

Demand of 1.5 MGD being met by this lake only

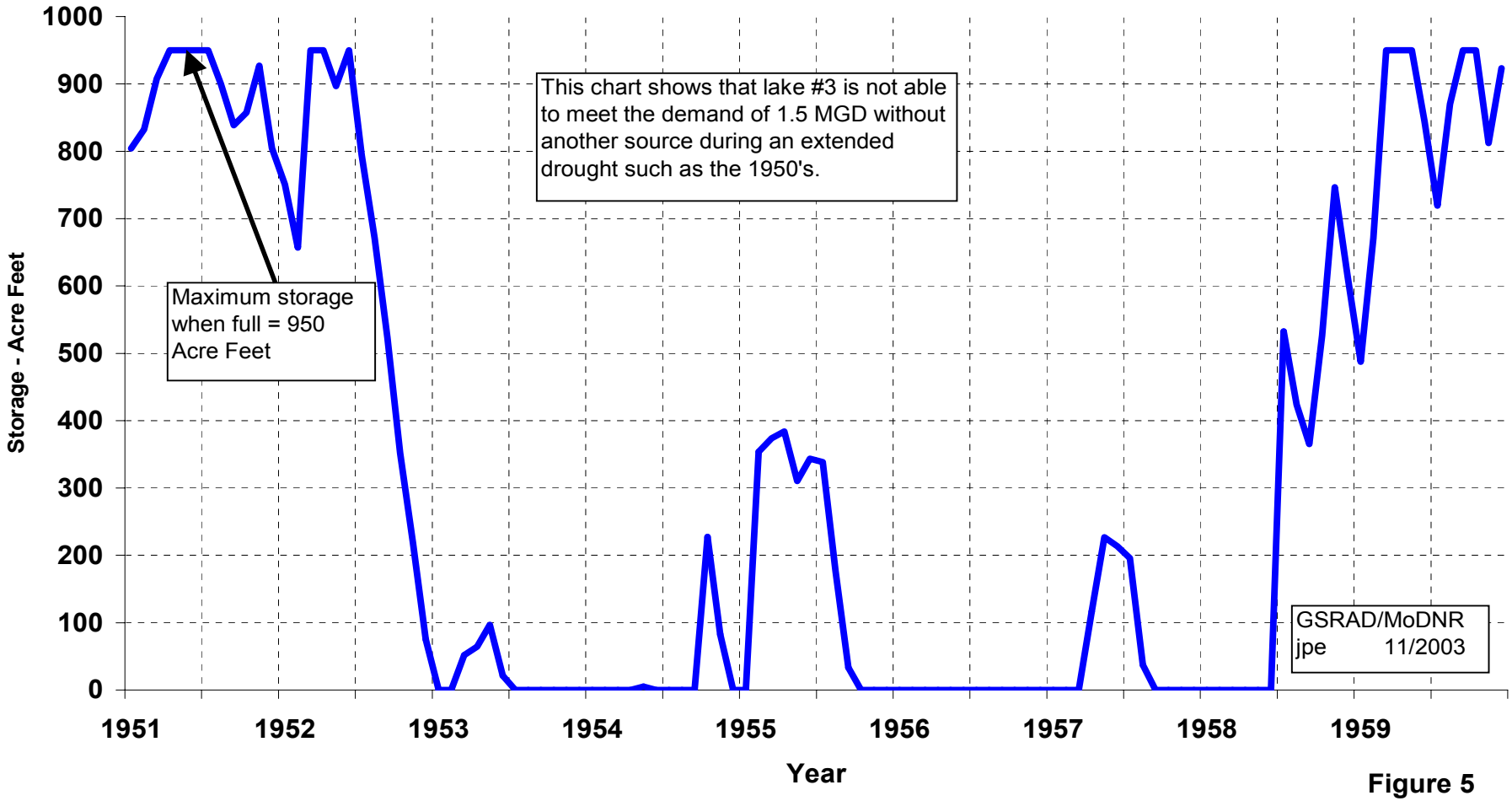


Figure 5

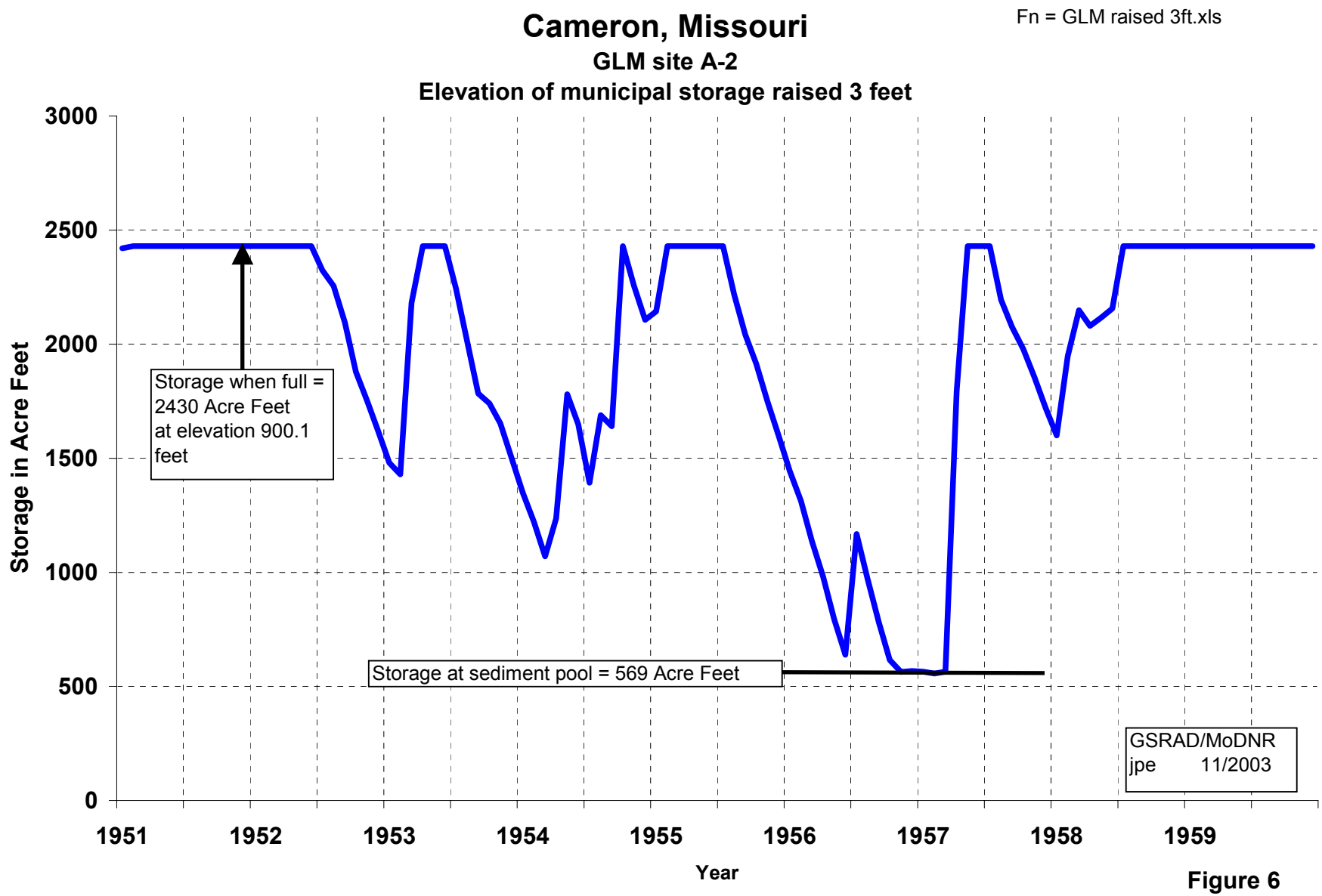

Cameron, Missouri
GLM site A-2
Elevation of municipal storage raised 3 feet
Fn = GLM raised 3ft.xls
Storage in Acre Feet
3000
2500
2000
1500
1000
500
0
1951
1952
1953
1954
1955
1956
1957
1958
1959
Year
Storage when full = 2430 Acre Feet at elevation 900.1 feet
Storage at sediment pool = 569 Acre Feet
GSRAD/MoDNR
jpe 11/2003

Figure 6

Cameron, Missouri

Grindstone Lost Muddy Site A2
Normal Run
Supplying 1.5 MGD
Water Supply storage raised 3 feet

Fn = glm-norm.xls

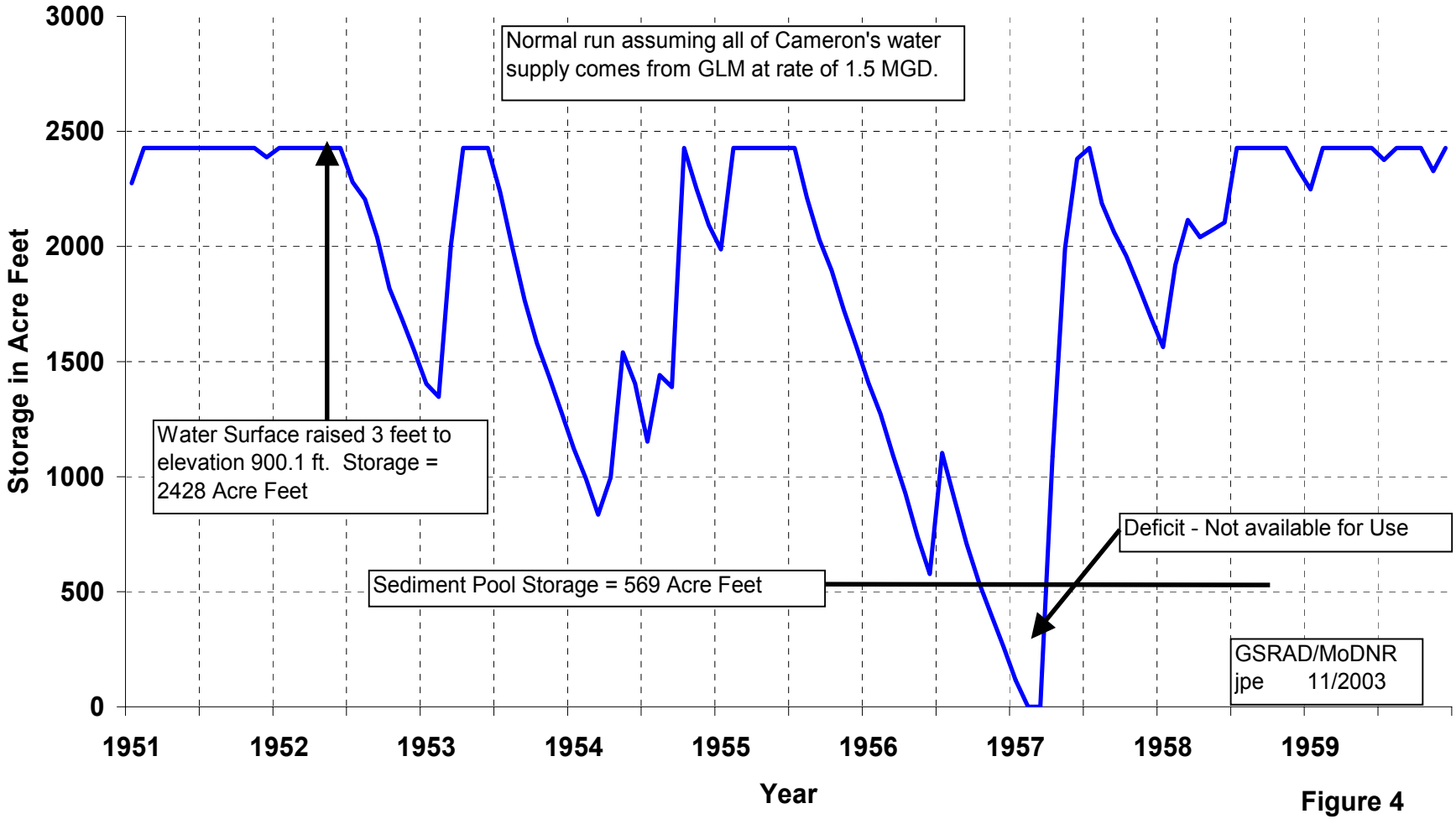


Figure 4

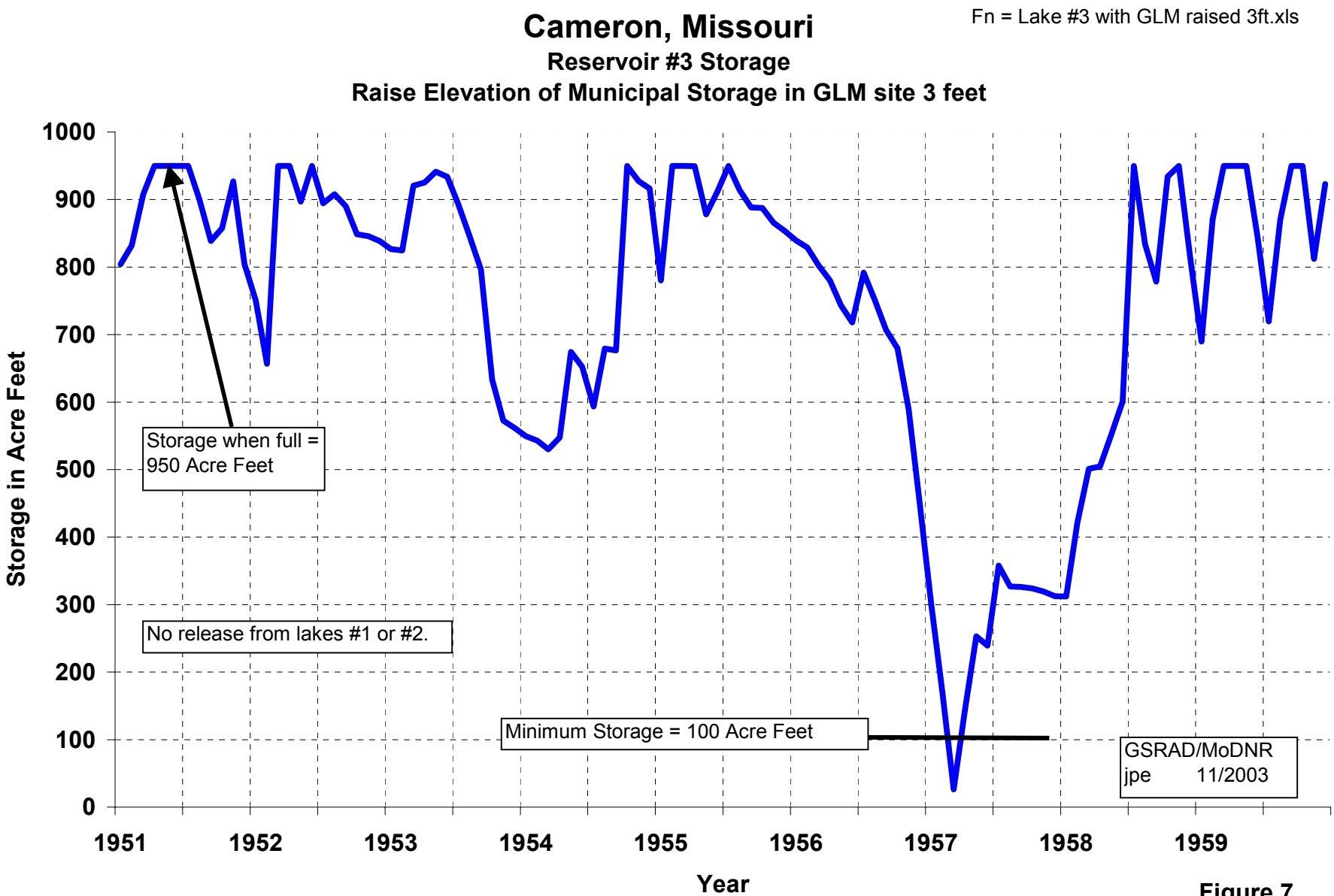
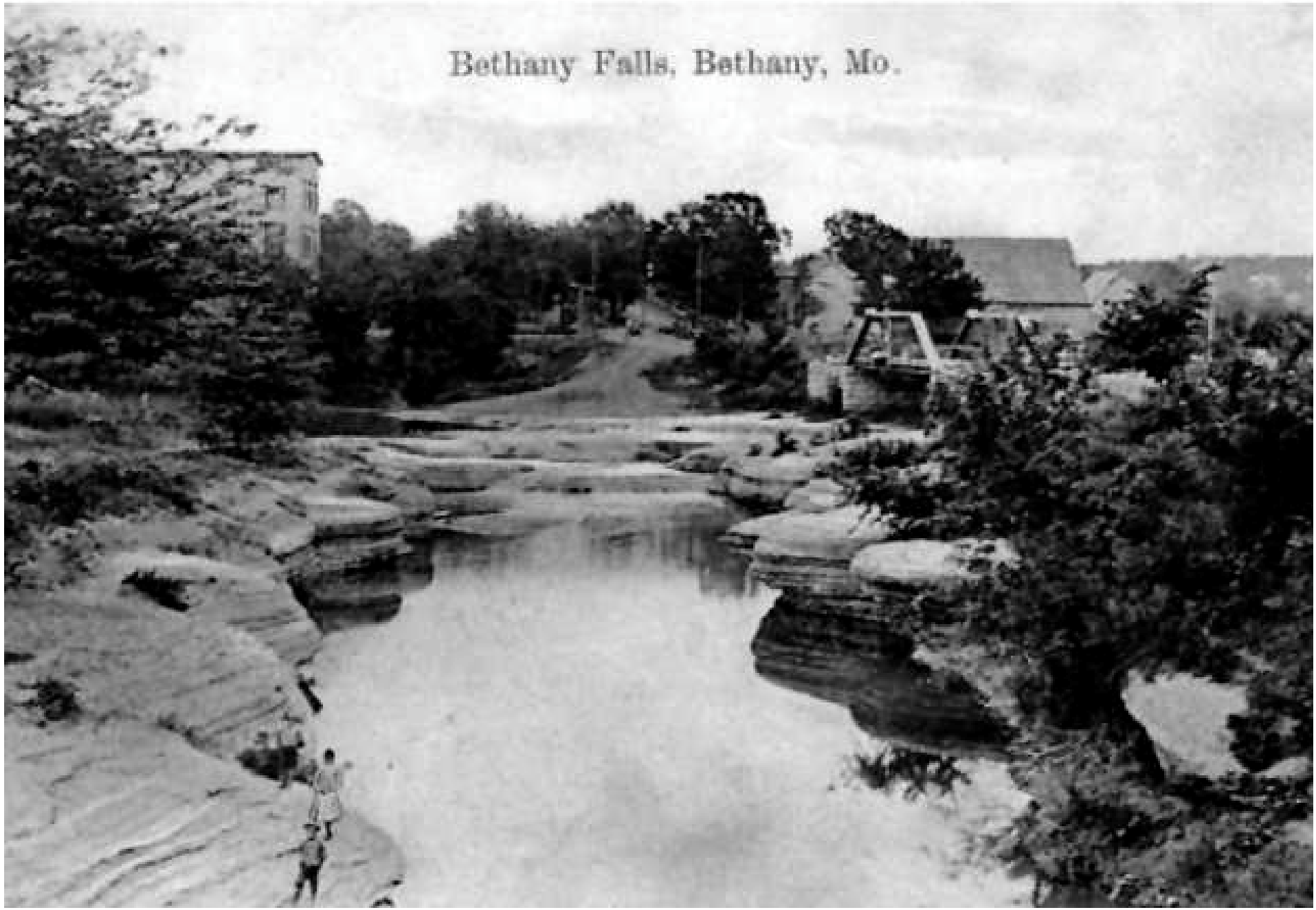

Cameron, Missouri
Reservoir #3 Storage
Raise Elevation of Municipal Storage in GLM site 3 feet
Fn = Lake #3 with GLM raised 3ft.xls
Storage in Acre Feet
1000
900
800
700
600
500
400
300
200
100
0
Storage when full = 950 Acre Feet
No release from lakes #1 or #2.
Minimum Storage = 100 Acre Feet
GSRAD/MoDNR
jpe 11/2003
1951
1952
1953
1954
1955
1956
1957
1958
1959
Year

Figure 7


Bethany Falls, Bethany, Mo.