

# Buford Dam Water Supply Analysis

Prepared at the request of  
Office of Counsel  
November 23, 2008

# Objective

- Determine amount of storage space required to meet water supply above baseline
- Determine impact to reservoir operation while meeting support water supply
  - Generation
  - Storage
  - Elevation

# Required Storage Methodology

- Lake Withdrawal
  - The storage required to meet lake withdrawals is the direct proportion of withdrawal to the yield of the total storage
- River withdrawal
  - The release for water supply for downstream users is assumed to be released that must be shifted from weekday peak power generation.
  - Storage required corresponds to the portions of yield needed for off-peak generation. How much generation must be shifted to off-peak (weekend) in critical period to provide for river withdrawals?

# Impact Methodology

1. Determine from historic records the maximum water supply use year at the reservoirs
2. Incorporate the maximum water use from step 1 into the Reservoir System model
3. Run the model for the period record the base condition water use and the reservoir maximum water use year.
4. Run baseline conditions model
5. Compute the following impacts to baseline
  - maximum use of storage to support the water supply. Should occur in the most critical year.
  - Impact to monthly generation for period of record
  - Impact to reservoir elevation

# Baseline Conditions

- 327 mgd river withdrawal, 10 mgd lake
- 266 mgd river withdrawal, 10 mgd lake
- 230 mgd river withdrawal, 10 mgd lake

# 327 MGD Base Conditions

- Buford dam has operated to meet water supply since the project completion. This includes direct withdrawals from the reservoir and reservoir release to support river withdrawals between the dam and Peachtree Creek.
- Two entities, City of Buford and Gainesville were granted relocation contracts because of existing water withdrawals water from the Chattahoochee river prior to the construction of Buford dam. The total withdrawal from the relocation contract is 10 MGD.
- ARC and the US Government signed a contract for water withdrawals from the Chattahoochee river downstream of Buford dam in 1986. Analysis to support implementation of the contract found that 327 MGD can be provided year-round with no impact on the project (Buford Dam).

# 266 MGD Base Conditions

- Buford dam has operated to meet water supply since the project completion. This includes direct withdrawals from the reservoir and reservoir release to support river withdrawals between the dam and Peachtree Creek.
- Two entities, City of Buford and Gainesville were granted relocation contracts because of existing water withdrawals water from the Chattahoochee river prior to the construction of Buford dam. The total withdrawal from the relocation contract is 10 MGD.
- Metro Atlanta Water Users and Government agreed to a Modified Interim Water Supply Agreement for water withdrawals from the Chattahoochee river downstream of Buford dam in 1979. Analysis to support implementation of the agreement found that **266** MGD can be provided with no impact on the project (Buford Dam).
- Monthly distribution [230 mgd Sep-Apr, 327mgd May-Aug]

# 230 MGD Base Conditions

- Buford dam has operated to meet water supply since the project completion. This includes direct withdrawals from the reservoir and reservoir release to support river withdrawals between the dam and Peachtree Creek.
- Two entities, City of Buford and Gainesville were granted relocation contracts because of existing water withdrawals water from the Chattahoochee river prior to the construction of Buford dam. The total withdrawal from the relocation contract is 10 MGD.
- Metro Atlanta Water Users and Government agreed to a Short Term Interim Water Supply Agreement for water withdrawals from the Chattahoochee river downstream of Buford dam in 1975. Analysis to support implementation of the agreement found that **230** MGD can be provided with no impact on the project (Buford Dam).
- Monthly distribution [145 mgd Nov-Feb, 217 mgd Mar-Apr, Sep-Oct, 327mgd May-Aug]

# Maximum Water Use Determination

# Water Supply Contracts

- Lake Lanier
  - City of Buford
  - City of Cummings
  - City of Gainesville
  - Gwinnett County
- Chattahoochee River
  - Atlanta – Fulton County
  - City of Atlanta
  - Cobb County Marietta Water Authority
  - Gwinnett County (Emergency only)
  - 5 Agencies represented by Atlanta Regional Commission (ARC)

# Historic Water Use

Data	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Average of Atlanta, City of	115.42	109.22	102.31	105.77	100.72	95.93	93.83	93.03	98.09	105.29
Average of Atlanta-Fulton Co. Water Res. Commission	16.42	14.03	20.87	16.42	26.80	32.55	34.33	34.96	39.39	44.80
Average of Dekalb Co Public Works - Water & Sewer	75.28	76.10	75.10	75.60	79.95	81.91	82.30	83.61	89.05	90.53
Average of Cobb Co - Marietta Water Authority	37.36	32.85	33.81	33.33	39.83	36.01	31.29	38.27	43.08	43.63
Average of Buford, City Of	0.74	0.80	0.89	0.85	0.80	0.99	0.99	1.17	1.34	1.45
Average of Cumming, City Of	4.38	4.40	4.36	4.41	5.45	7.91	8.73	9.76	10.32	12.98
Average of Gainesville, City Of	11.29	11.63	12.18	13.11	12.99	13.81	14.06	14.34	16.26	17.44
Average of Gwinnett County Water & Sewerage Auth	48.25	47.19	50.40	48.80	58.36	66.51	68.52	66.15	81.66	88.13
<b>Total</b>	<b>309</b>	<b>296</b>	<b>300</b>	<b>298</b>	<b>325</b>	<b>336</b>	<b>334</b>	<b>341</b>	<b>379</b>	<b>404</b>

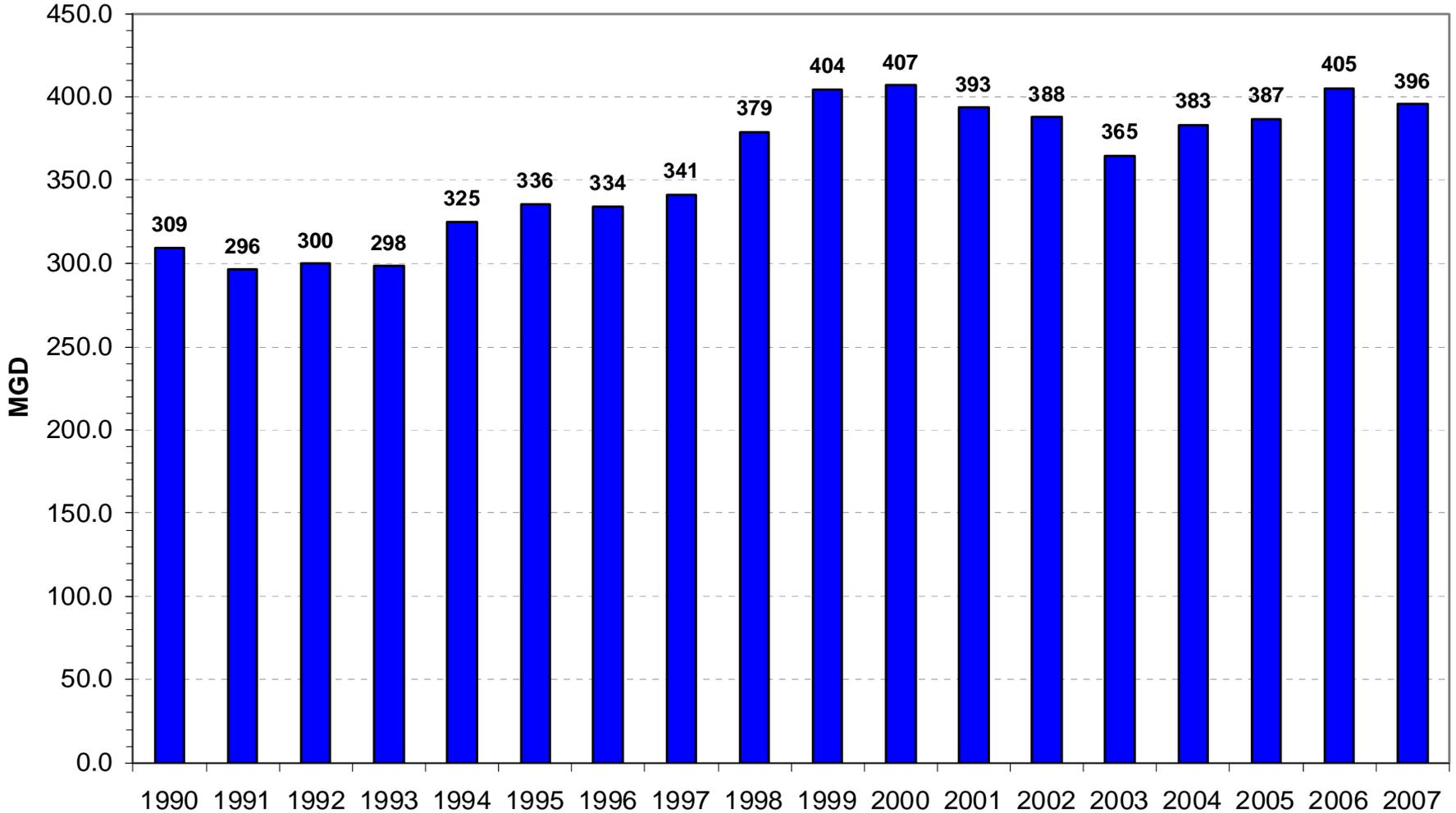
Data	2000	2001	2002	2003	2004	2005	2006	2007
Average of Atlanta, City of	106.82	101.93	101.17	95.47	96.61	100.47	102.54	100.90
Average of Atlanta-Fulton Co. Water Res. Commission	42.61	43.90	43.39	40.12	40.99	42.80	43.76	44.07
Average of Dekalb Co Public Works - Water & Sewer	94.18	87.88	87.38	82.23	83.98	83.05	82.81	78.36
Average of Cobb Co - Marietta Water Authority	47.06	42.92	43.45	41.73	46.85	46.95	51.00	52.14
Average of Buford, City Of	1.36	1.26	1.29	1.40	1.43	1.44	1.53	1.47
Average of Cumming, City Of	11.56	12.33	10.35	10.80	11.15	10.51	11.93	11.63
Average of Gainesville, City Of	18.25	17.48	17.31	16.69	17.72	17.86	18.98	18.75
Average of Gwinnett County Water & Sewerage Auth	85.04	85.62	83.63	76.32	84.33	83.56	92.57	88.19
<b>Total</b>	<b>407</b>	<b>393</b>	<b>388</b>	<b>365</b>	<b>383</b>	<b>387</b>	<b>405</b>	<b>396</b>

# Year 2000 Withdrawal vs Contract Amount

<b>Water Supply Contract</b>	<b>2000 (MGD)</b>	<b>Contract Max Amount (MGD)</b>
Atlanta Regional Commission (ARC) Total	290.67	377
City of Atlanta	106.82	
Atlanta-Fulton Co. Water Res. Commission	42.61	
DeKalb Co Public Works - Water & Sewer	94.18	
Cobb Co - Marietta Water Authority	47.06	
City Of Buford	1.36	2
City Of Cumming	11.56	10
City Of Gainesville,	18.25	20 (Net)
Gwinnett County Water & Sewerage Auth	85.04	53
<b>Total</b>	<b>407</b>	<b>462</b>

## Average Daily Withdrawal Lanier Water Supply Contracts

Statewide water conservation measures implemented during the 2000 drought resulted in a reduction in water use from 2001 to 2005



# Year 2000 River Withdrawals

<b>Month</b>	<b>ARC River Withdrawal (MGD)</b>
Jan	253.2
Feb	255.4
Mar	253.2
Apr	265.2
May	328.4
Jun	347.2
Jul	352.5
Aug	333.8
Sep	288.8
Oct	295.3
Nov	262.5
Dec	252.8
Average	290.7

# Water Use Ranking

Rank	Year	Daily Average (MGD)
1	2000	406.9
2	2006	405.1
3	1999	404.3
4	2007	395.5
5	2001	393.3
6	2002	388.0
7	2005	386.6
8	2004	383.0
9	1998	379.2
10	2003	364.8
11	1997	341.3
12	1995	335.6
13	1996	334.0
14	1994	324.9
15	1990	309.2
16	1992	299.9
17	1993	298.3
18	1991	296.2

# Storage Computation

# Lake Lanier Yield and Storage Amounts

Dependable Yield (MGD) (based in 1980's as critical period)	<b>947</b>
Conservation Storage (AC-FT) [1070-1035]	1,049,400
Conservation Storage (AC-FT) [1071-1035]	1,087,600
Usable Storage (AC-FT, Conservation plus FC)	1,686,400

# Year 2000 Withdrawal Amount above Baseline

## Lake Withdrawal Storage

<b>User</b>	<b>2000 Use (MGD)</b>	<b>Relocation Contract (MGD)</b>	<b>Allocation Amount (MGD)</b>
City Of Buford	1.36	2	0
City Of Cumming	11.56		11.56
City Of Gainesville,	18.25	8	10.25
Gwinnett County Water & Sewerage Auth	85.04		85.04

# Storage Required to Meet Lake Withdrawals above Baseline

## Lake Withdrawal Storage

User	Allocation Amount (MGD)	Percent of Yield	Storage Allocation
City Of Buford	0		
City Of Cumming	11.56	1.22%	13,276
City Of Gainesville,	10.25	1.08%	11,772
Gwinnett County Water & Sewerage Auth	85.04	8.98%	97,666
<b>Total</b>	106.85	11.28%	122,714*

\*Based on storage between elevation 1071-1035, 1,087,600 ac-ft

# River Withdrawal Spreadsheet Analysis

# Spreadsheet Assumptions

1. Critical period from worst flow sequence in the unimpaired flow sequence, 1986-1989.
2. Storage required corresponds to the portions of yield needed for off-peak generation. How much generation must be shifted to off-peak (weekend) in critical period to provide for river withdrawals?
3. Based on Mobile District computations and evaluations to date, the conservation storage is estimated to have a safe yield of 947 MGD (1,465 cfs). Conservation storage is the space between lake elevation 1070 and 1035 and approximately 1,049,400 acre-feet.
4. The inflow into Buford Dam is the unimpaired flow at the Buford Dam site minus evaporation losses.
5. Buford maintains a continuous minimum release of 600 cfs.

# Assumptions Continued

6. Morgan Falls usable storage of 1300 ac-ft is available for re-regulation. Storage based on a survey conducted by Corps of Engineers in the winter 2001-2002.
7. The Chattahoochee River intervening flow between Buford Dam and the downstream confluence with Peachtree Creek is the observed intervening flow corrected for depletions. Computed using the following formula:  
Atlanta gage (Vinnings) monthly flow – Buford Monthly discharge + recorded monthly withdrawals – monthly returns.  
Note: All values are monthly averages, withdrawals and returns from water users represented by ARC: City of Atlanta, DeKalb County, Fulton County, Cobb County Marietta Water Authority and Gwinnett County.
8. The river withdrawal distributed monthly using historic pattern of year 2000.
9. Percent of River Withdrawal returned to Chattahoochee River above Peachtree based on year 2000 ratio, equal to 14.4%

# Storage Required to Meet River Withdrawals

## River Withdrawal Storage Requirement

<b>Condition</b>	<b>River Annual Withdrawal</b>	<b>Percent of Yield</b>	<b>Storage Allocation</b>
327 MGD Baseline	327	2%	17,940
266 MGD Baseline	266	1%	14,680
230 MGD Baseline	230	1%	14,680
Year 2000	290.6	2%	18,150

# Storage Required to Meet River Withdrawals above Baseline

## Storage Required Above Baseline

<b>Baseline</b>	<b>Additional Storage (acre-feet)</b>
327 MGD Baseline	210
266 MGD Baseline	3,470
230 MGD Baseline	3,470

# Storage Required to Meet Year 2000 Withdrawals above Baseline

## Total Storage Required Above Baseline

<b>Baseline</b>	<b>River Withdrawal</b>	<b>Lake</b>	<b>Total (acre-feet)</b>
327 MGD Baseline	210	122,714	122,924
266 MGD Baseline	3,470	122,714	126,184
230 MGD Baseline	3,470	122,714	126,184

# Model Results - Storage Use

# 327 MGD Baseline Conditions Reservoir Model Setting

- Reservoir Operation
  - 1989 Water Control Plan without navigation demand
- Lake withdrawals
  - 10 mgd (15.47 cfs)
- River withdrawals
  - 327 mgd (505.87 cfs)
- River returns (below Peachtree Creek)
  - 55% of withdrawal; 179.85 mgd (278.23 cfs)
- 600 cfs release continuously to meet WS and WQ
- Year 2000 Water Use for remainder of basin
- Period of Analysis
  - 01Jan1939 through 31Dec2007

# 266 MGD Baseline Conditions Reservoir Model Setting

- Reservoir Operation
  - 1989 Water Control Plan without navigation demand
- Lake withdrawals
  - 10 mgd (15.47 cfs)
- River withdrawals
  - 266 mgd (411.5 cfs)
  - 230 mgd Sep-Apr, 327mgd May-Aug
- River returns (below Peachtree Creek)
  - 55% of withdrawal; 146.3 mgd (226.3 cfs)
- 600 cfs release continuously to meet WS and WQ
- Year 2000 Water Use for remainder of basin
- Period of Analysis
  - 01Jan1939 through 31Dec2007

# 230 MGD Baseline Conditions Reservoir Model Setting

- Reservoir Operation
  - 1989 Water Control Plan without navigation demand
- Lake withdrawals
  - 10 mgd (15.47 cfs)
- River withdrawals
  - 230 mgd (355.8 cfs)
  - 145 mgd Nov-Feb, 217 mgd Mar-Apr, Sep-Oct, 327mgd May-Aug
- River returns (below Peachtree Creek)
  - 55% of withdrawal; 126.5 mgd (195.7 cfs)
- 600 cfs release continuously to meet WS and WQ
- Year 2000 Water Use for remainder of basin
- Period of Analysis
  - 01Jan1939 through 31Dec2007

# Year 2000 Water Use – Reservoir Model Setting

- Reservoir Operation
  - 1989 Water Control Plan without navigation demand
- Lake withdrawals
  - 116.2 mgd (179.8 cfs)
- River withdrawals
  - 290.8 mgd (449.7 cfs)
- 600 cfs release continuously to meet WS and WQ
- Year 2000 Water Use for remainder of basin
- Period of Analysis
  - 01Jan1939 through 31Dec2007

# Monthly Generation

# Mobile District Hydropower Capacity

<b>Project</b>	<b>Maximum Capacity (MegaWatts)</b>	<b>Percent of Total</b>
*Allatoona	37	3%
Buford	106	9%
Carters	575	51%
**WF George	121.5	11%
West Point	83	7%
Jim Woodruff	43.5	4%
Millers Ferry	72	6%
Jones Buff	82	7%
Total	1120	

\* Unit 1 unavailable

\*\* Unit 3 is unavailable due to rehab

# SEPA Georgia-Alabama Hydropower Capacity

Project	Maximum Capacity (MegaWatts)	Percent of Total
*Allatoona	37	2%
Buford	106	5%
Carters	575	24%
**WF George	121.5	5%
West Point	83	4%
Jim Woodruff	43.5	2%
Millers Ferry	72	3%
Jones Buff	82	3%
Hartwell	348	15%
Russell	600	26%
Thurman	280	12%
Total	2348	

\* Unit 1 unavailable

\*\* Unit 3 is unavailable due to rehab

# Hydropower System

Southeastern Power Administration (SEPA) of the United States Department of Energy, is responsible for marketing electric power and energy generated at reservoirs operated by the United States Army Corps of Engineers. Mobile District hydropower projects are part of the GA-AL-SC and Jim Woodruff systems shown to the right. Mobile District declares the available energy and SEPA schedules the daily hydropower generation to meet customer peak demands.



# Buford Dam Average Peaking Periods By Month from August 2006 - November 2008

Hour of Day	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
100	-	-	-	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-	-	-	-	-	-
400	-	-	-	-	-	-	-	-	-	-	-	-
500	-	-	-	-	-	-	-	-	-	-	-	-
600	-	-	-	-	-	-	-	-	-	-	P	-
700	P	-	-	-	-	-	-	-	-	-	P	P
800	P	P	P	P	-	-	-	-	-	P	P	P
900	P	P	P	P	-	-	-	-	-	P	P	P
1000	-	-	-	-	-	-	-	-	-	-	P	P
1100	-	-	-	-	-	-	-	-	-	-	P	-
1200	-	-	-	-	-	-	-	-	-	-	-	-
1300	-	-	-	-	-	-	-	-	-	-	-	-
1400	-	-	-	-	-	-	-	-	-	-	-	-
1500	-	-	-	-	P	P	-	-	-	-	-	-
1600	-	-	-	-	P	P	-	P	P	P	-	-
1700	-	-	-	-	P	P	P	P	P	P	-	-
1800	-	-	-	-	P	P	P	P	P	P	-	-
1900	-	-	-	-	P	P	P	P	P	P	P	P
2000	P	-	-	-	-	P	P	P	P	P	P	P
2100	P	-	P	P	P	P	P	P	P	P	P	P
2200	-	-	-	-	-	-	P	-	P	P	P	-
2300	-	-	-	-	-	-	-	-	P	-	-	-
2400	-	-	-	-	-	-	-	-	-	-	-	-
	P	Denotes hydropower peaking operation										

# Buford

## Average Monthly Energy MWH

**Buford Monthly Generation**

Month	Year 2000 Water Supply (MWH)	327 MGD Base Condition (MWH)	266 MGD Base Condition (MWH)	230 MGD Base Condition (MWH)	% Reduction to 327 MGD as Base	% Reduction to 366 MGD as Base	% Reduction to 230 MGD as Base
Jan	12304	12495	12,591	12,591	1.5%	2.3%	2.3%
Feb	12782	12938	13,090	13,118	1.2%	2.3%	2.6%
Mar	17331	17421	17,432	17,547	0.5%	0.6%	1.2%
Apr	13862	14003	14,046	14,088	1.0%	1.3%	1.6%
May	14022	14085	14,235	14,271	0.4%	1.5%	1.7%
Jun	9389	9406	9,475	9,495	0.2%	0.9%	1.1%
Jul	9293	9305	9,384	9,399	0.1%	1.0%	1.1%
Aug	8994	9002	8,991	8,990	0.1%	0.0%	0.0%
Sep	7441	7696	7,452	7,434	3.3%	0.2%	-0.1%
Oct	7662	7753	7,586	7,566	1.2%	-1.0%	-1.3%
Nov	7694	7847	7,732	7,599	2.0%	0.5%	-1.2%
Dec	9472	9597	9,557	9,481	1.3%	0.9%	0.1%
Average	10,854	10,962	10,964	10,965	1.0%	1.0%	1.0%

No significant impact to monthly generation

# West Point

## Average Monthly Energy MWH

West Point Monthly Generation

Month	Year 2000 Water Supply (MWH)	327 MGD Base Condition (MWH)	266 MGD Base Condition (MWH)	230 MGD Base Condition (MWH)	% Reduction to 327 MGD as Base	% Reduction to 366 MGD as Base	% Reduction to 230 MGD as Base
Jan	16435	16466	16,466	16,466	0.2%	0.2%	0.2%
Feb	16931	17121	17,121	17,121	1.1%	1.1%	1.1%
Mar	20654	20909	20,909	20,909	1.2%	1.2%	1.2%
Apr	17068	17201	17,201	17,201	0.8%	0.8%	0.8%
May	12586	13036	13,036	13,036	3.5%	3.5%	3.5%
Jun	9661	10117	10,117	10,117	4.5%	4.5%	4.5%
Jul	10138	10568	10,568	10,568	4.1%	4.1%	4.1%
Aug	8438	8747	8,747	8,747	3.5%	3.5%	3.5%
Sep	7096	7313	7,313	7,313	3.0%	3.0%	3.0%
Oct	7321	7506	7,506	7,506	2.5%	2.5%	2.5%
Nov	11460	11538	11,538	11,538	0.7%	0.7%	0.7%
Dec	14249	14147	14,147	14,147	-0.7%	-0.7%	-0.7%
Average	12,670	12,889	12,889	12,889	1.7%	1.7%	1.7%

No impact to monthly generation

# WF George

## Average Monthly Energy MWH

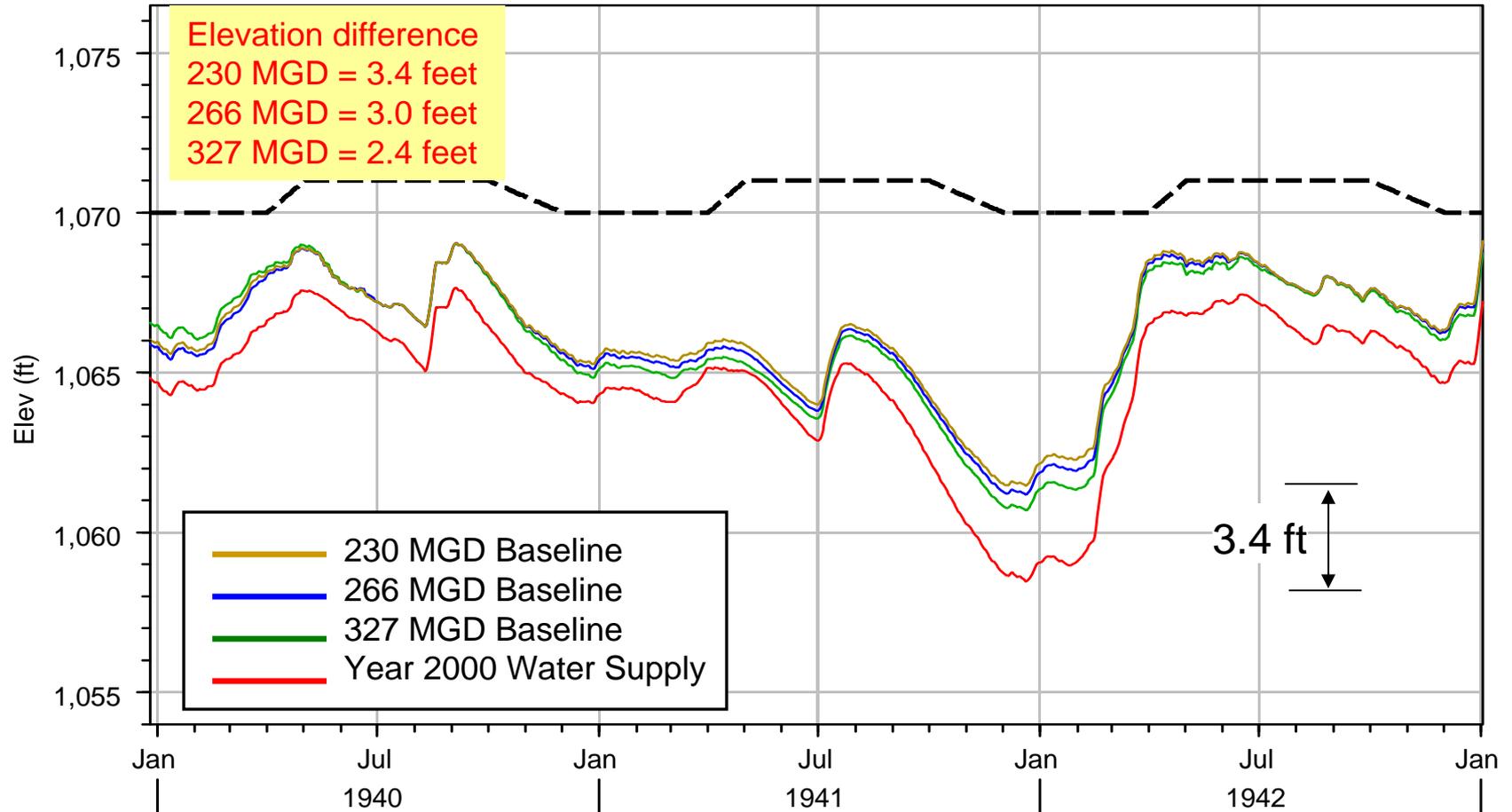
WF George Monthly Generation

Month	Year 2000 Water Supply (MWH)	327 MGD Base Condition (MWH)	266 MGD Base Condition (MWH)	230 MGD Base Condition (MWH)	% Reduction to 327 MGD as Base	% Reduction to 366 MGD as Base	% Reduction to 230 MGD as Base
Jan	46961	47008	47,008	47,008	0.1%	0.1%	0.1%
Feb	49966	50230	50,230	50,230	0.5%	0.5%	0.5%
Mar	62203	62422	62,422	62,422	0.4%	0.4%	0.4%
Apr	48735	48797	48,797	48,797	0.1%	0.1%	0.1%
May	28347	28810	28,810	28,810	1.6%	1.6%	1.6%
Jun	23873	24379	24,379	24,379	2.1%	2.1%	2.1%
Jul	26568	27085	27,085	27,085	1.9%	1.9%	1.9%
Aug	22621	22906	22,906	22,906	1.2%	1.2%	1.2%
Sep	18653	18899	18,899	18,899	1.3%	1.3%	1.3%
Oct	21372	21585	21,585	21,585	1.0%	1.0%	1.0%
Nov	28891	29070	29,070	29,070	0.6%	0.6%	0.6%
Dec	37979	37944	37,944	37,944	-0.1%	-0.1%	-0.1%
Average	34,681	34,928	34,928	34,928	0.7%	0.7%	0.7%

No impact to monthly generation

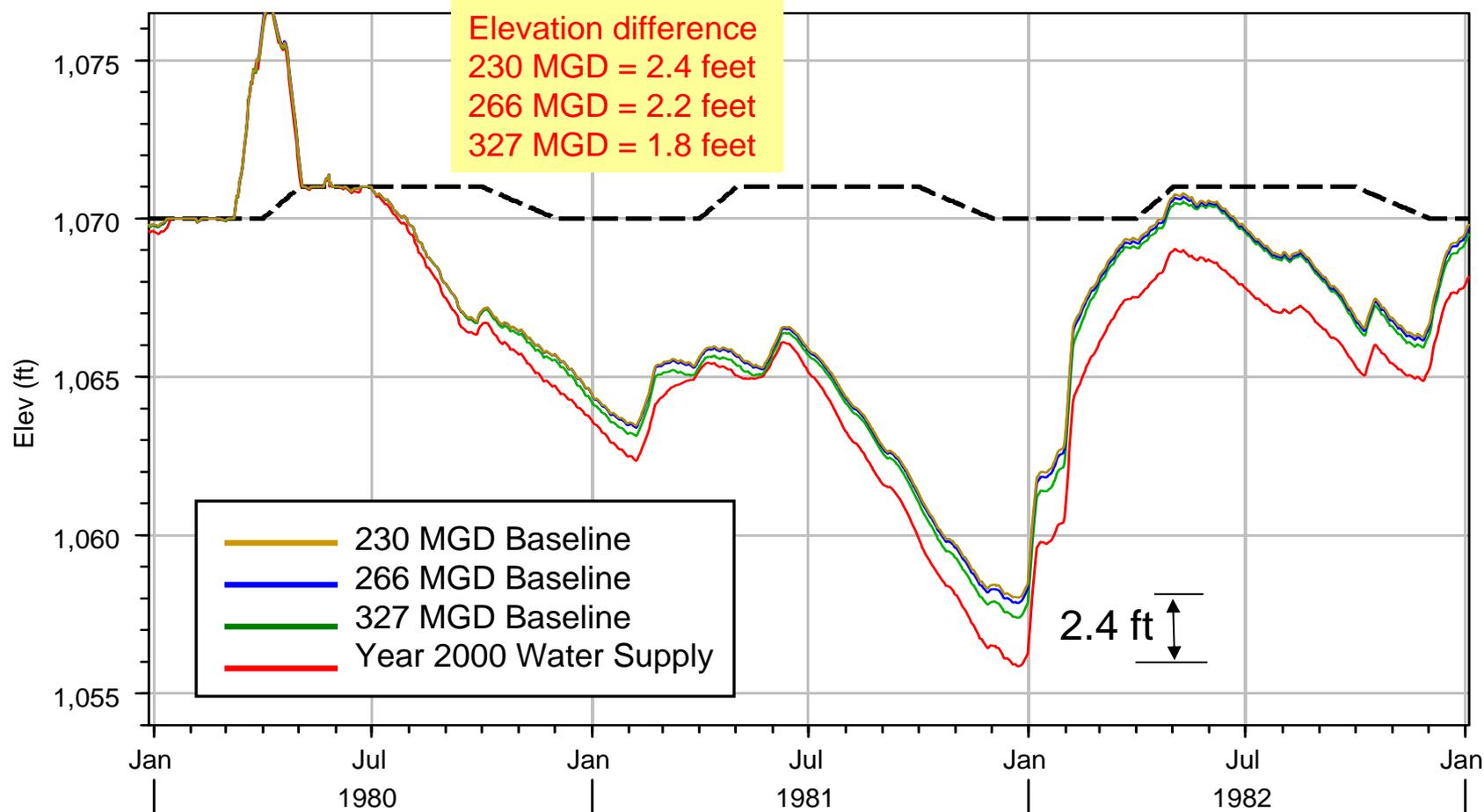
# Model Results – Pool Elevations

# 1939-1942 Drought Period Buford Elevation



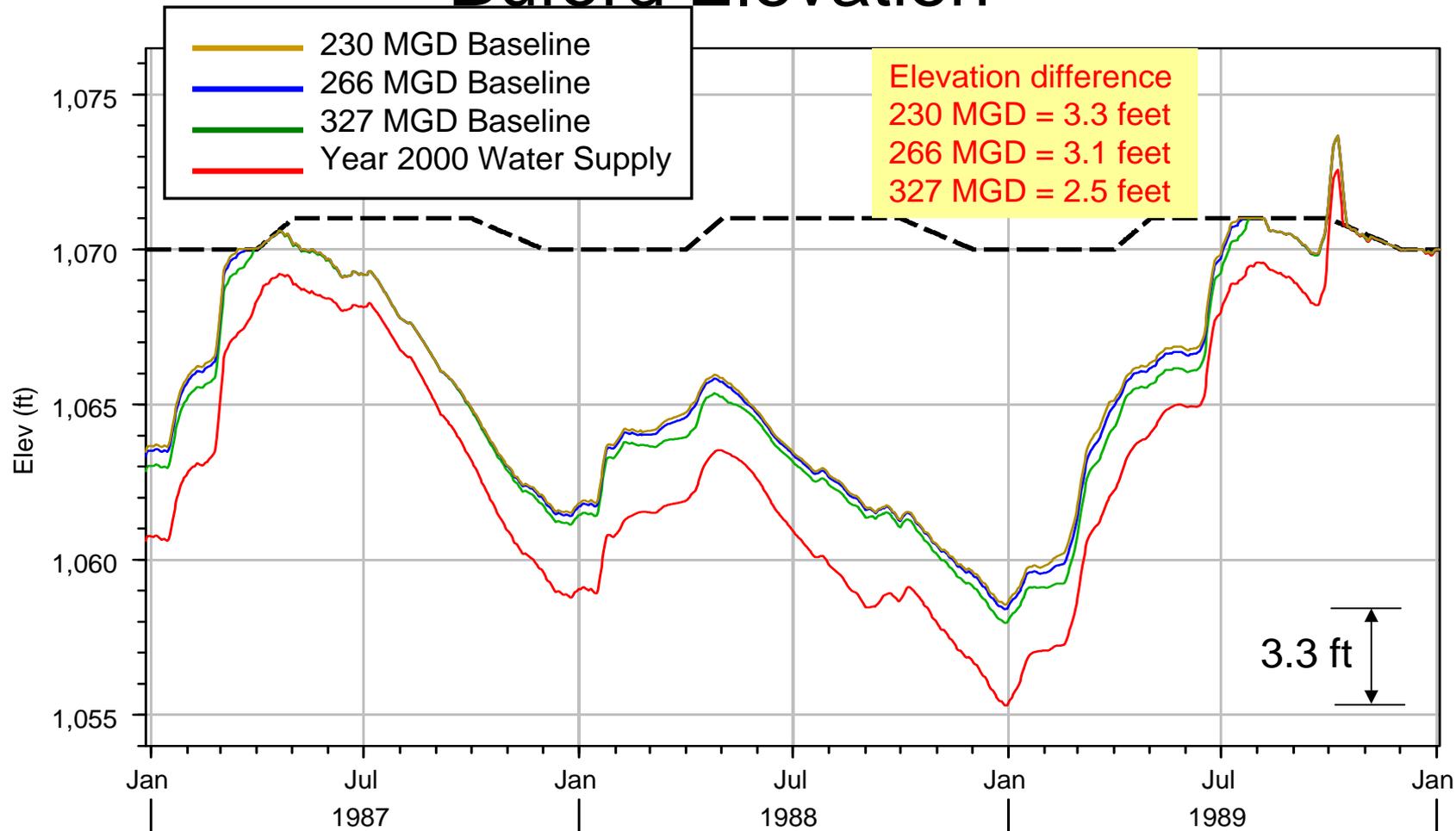
- BUFORD DAM ZONE1 ELEV
- BUFORD DAM WCP\_BASE\_327 ELEV
- BUFORD DAM WCP\_BASE\_230 ELEV
- BUFORD DAM WCP\_WWS\_2000 ELEV
- BUFORD DAM WCP\_BASE\_266 ELEV

# 1980-1982 Drought Period Buford Elevation



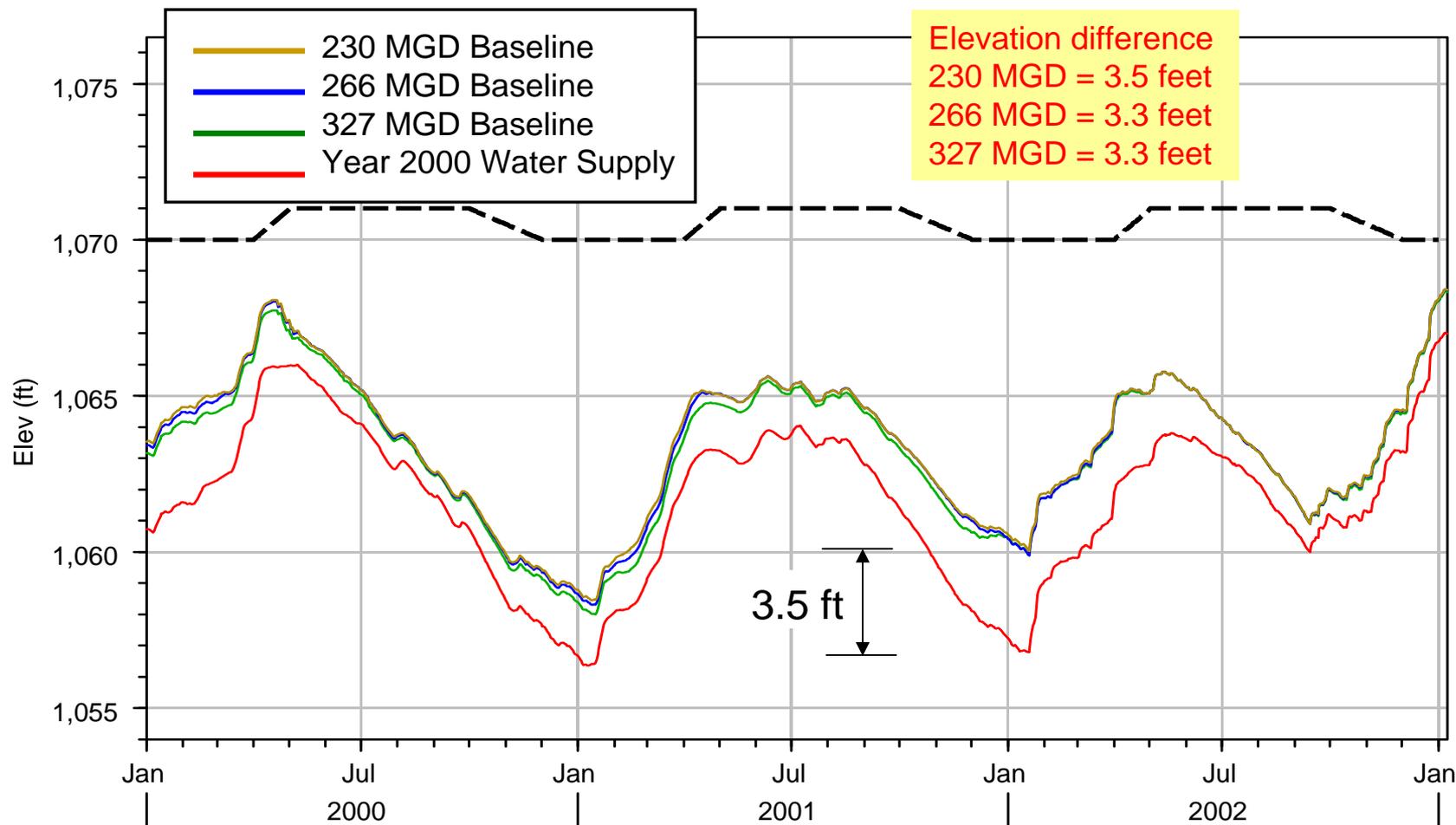
- BUFORD DAM ZONE1 ELEV
- BUFORD DAM WCP\_BASE\_327 ELEV
- BUFORD DAM WCP\_BASE\_230 ELEV
- BUFORD DAM WCP\_WWS\_2000 ELEV
- BUFORD DAM WCP\_BASE\_266 ELEV

# 1985-1989 Drought Period Buford Elevation



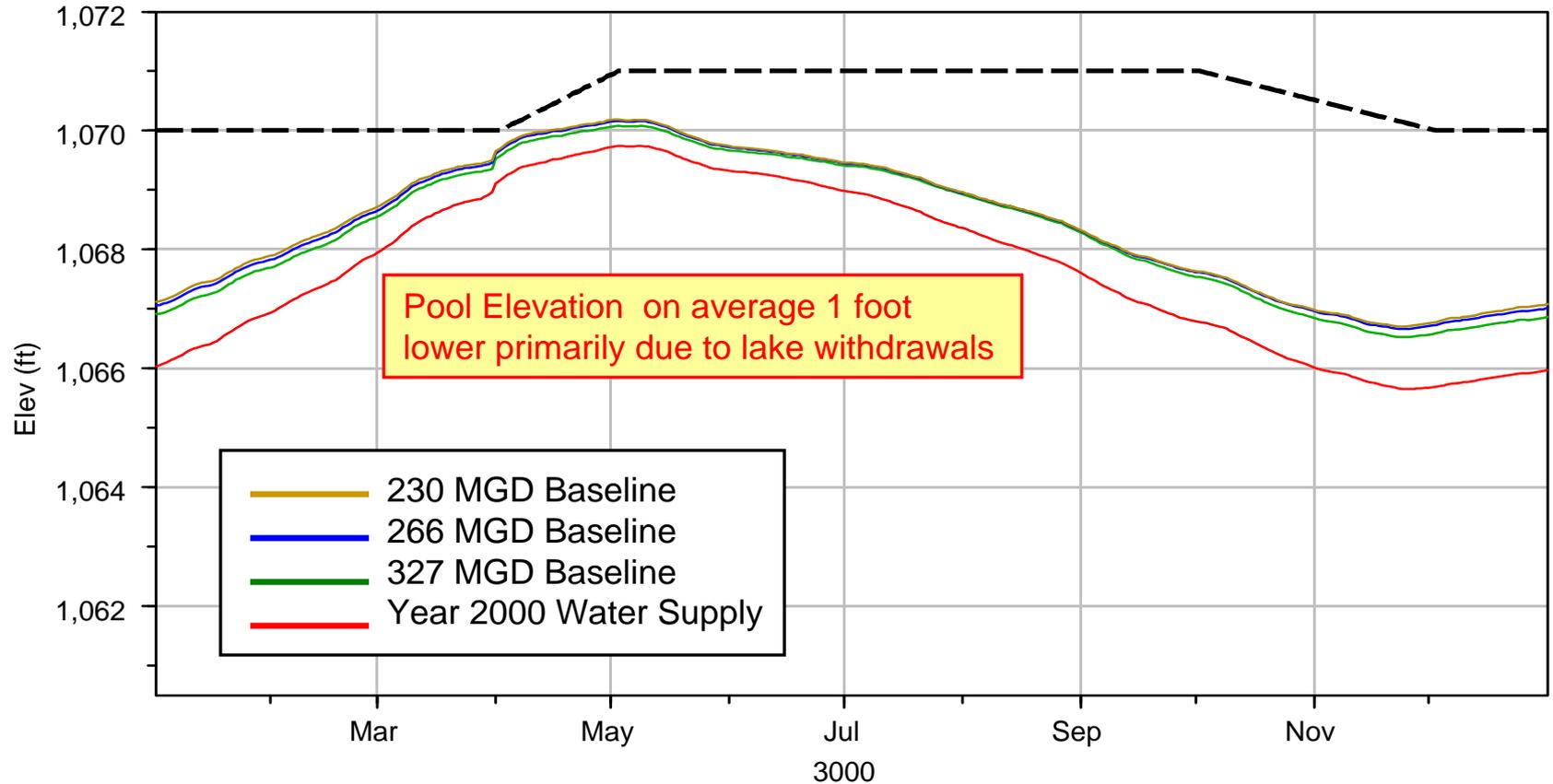
--- BUFORD DAM ZONE1 ELEV  
— BUFORD DAM WCP\_BASE\_327 ELEV  
— BUFORD DAM WCP\_BASE\_230 ELEV  
— BUFORD DAM WCP\_WWS\_2000 ELEV  
— BUFORD DAM WCP\_BASE\_266 ELEV

# 1999-2003 Drought Period Buford Elevation



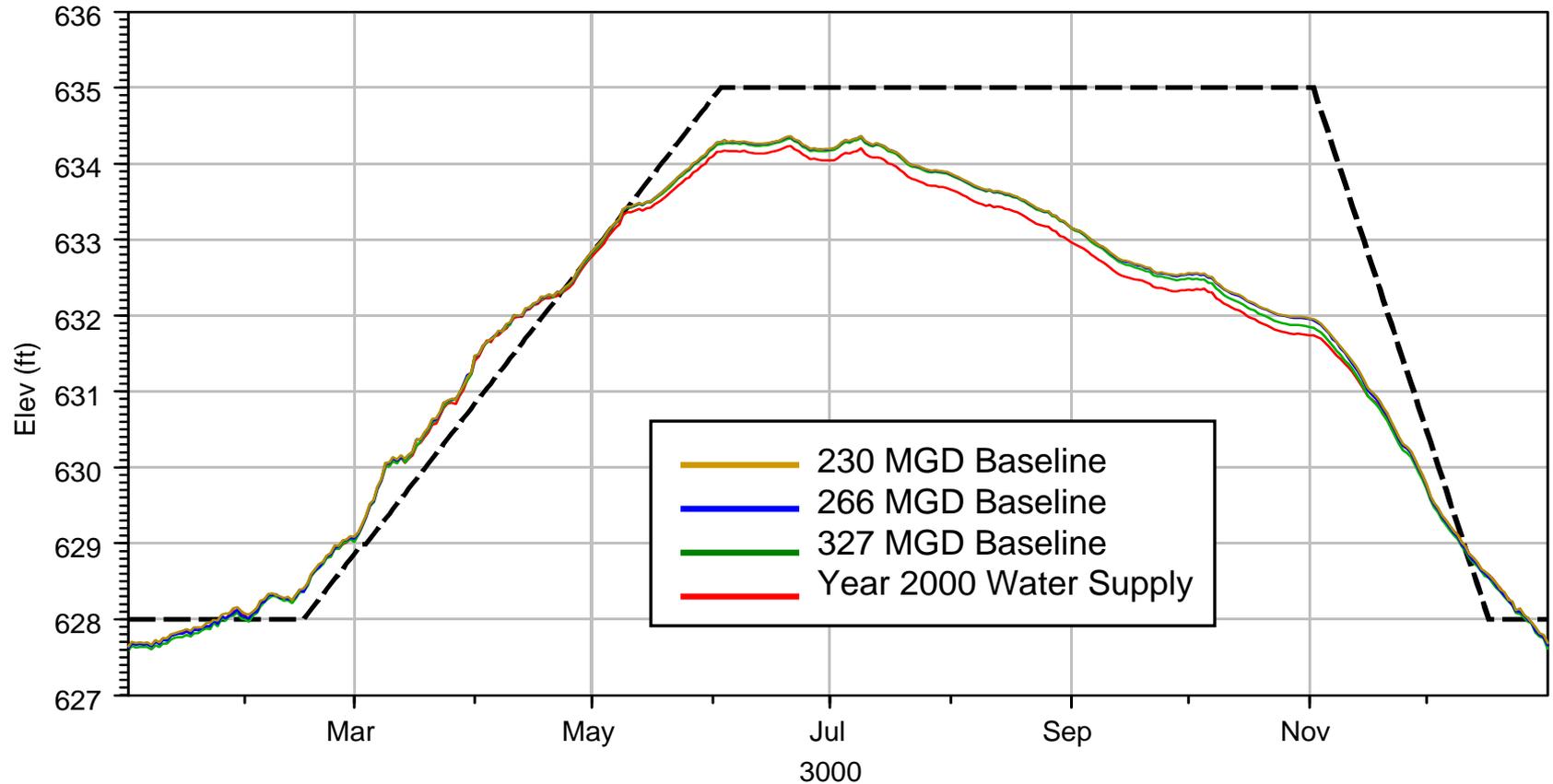
- BUFORD DAM ZONE1 ELEV
- BUFORD DAM WCP\_WWS\_2000 ELEV
- BUFORD DAM WCP\_BASE\_327 ELEV
- BUFORD DAM WCP\_BASE\_266 ELEV
- BUFORD DAM WCP\_BASE\_230 ELEV

# Buford Average Pool Elevation



- BUFORD DAM RULE CURVE ELEV
- BUFORD DAM WCP\_WWS\_2000[01JAN1939-30MAR2008] ELEV-AVER
- BUFORD DAM WCP\_BASE\_327[01JAN1939-30MAR2008] ELEV-AVER
- BUFORD DAM WCP\_BASE\_266[01JAN1939-30MAR2008] ELEV-AVER
- BUFORD DAM WCP\_BASE\_230[01JAN1939-30MAR2008] ELEV-AVER

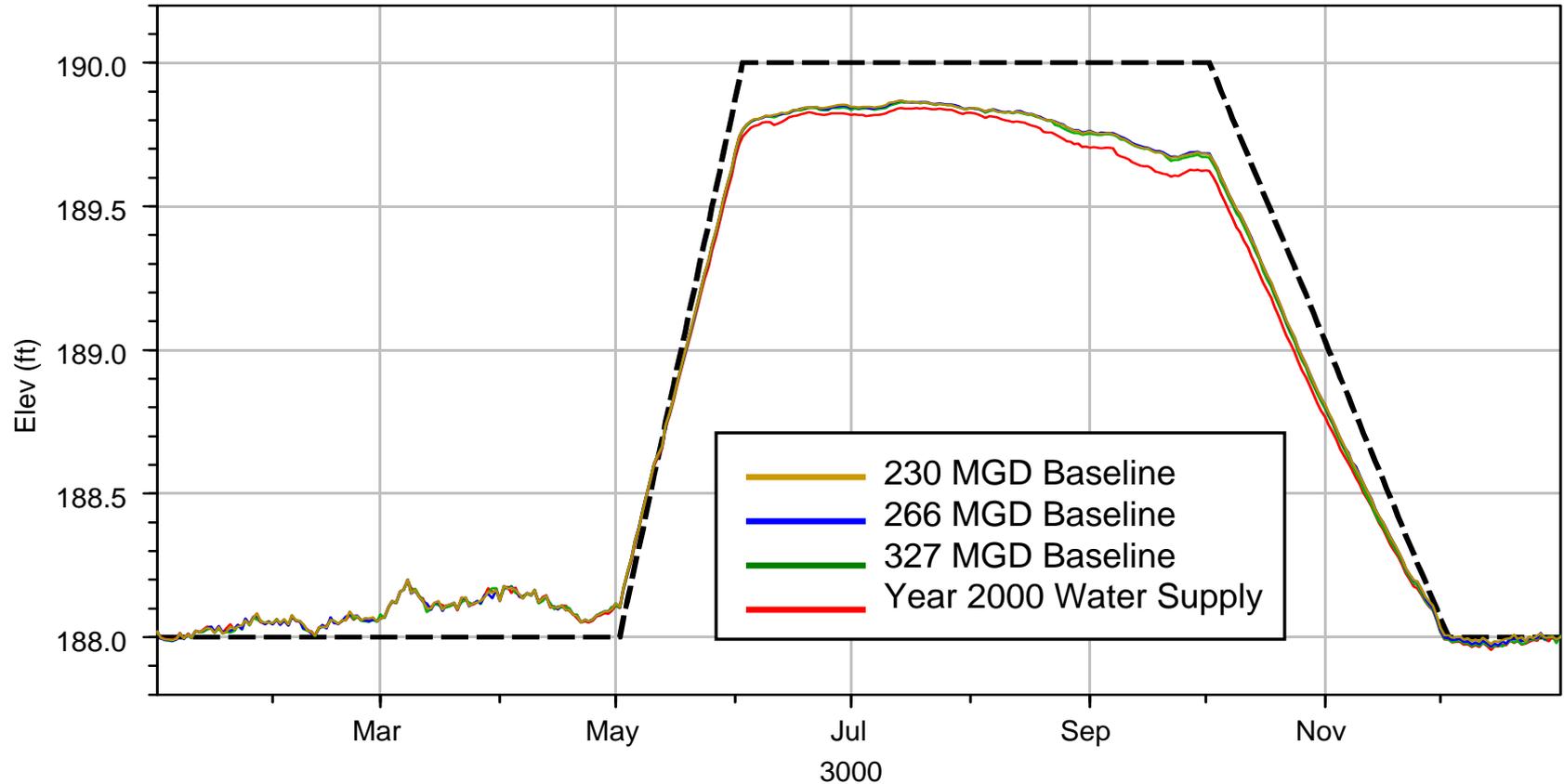
# West Point Average Pool Elevation



- WEST POINT RULE CURVE ELEV
- WEST POINT WCP\_WWS\_2000[01JAN1939-30MAR2008] ELEV-AVER
- WEST POINT WCP\_BASE\_327[01JAN1939-30MAR2008] ELEV-AVER
- WEST POINT WCP\_BASE\_266[01JAN1939-30MAR2008] ELEV-AVER
- WEST POINT WCP\_BASE\_230[01JAN1939-30MAR2008] ELEV-AVER

No impact to West Point Elevation

# Walter F George Average Pool Elevation



- W.F. GEORGE RULE CURVE ELEV
- W.F. GEORGE WCP\_WWS\_2000[01JAN1939-30MAR2008] ELEV-AVER
- W.F. GEORGE WCP\_BASE\_327[01JAN1939-30MAR2008] ELEV-AVER
- W.F. GEORGE WCP\_BASE\_266[01JAN1939-30MAR2008] ELEV-AVER
- W.F. GEORGE WCP\_BASE\_230[01JAN1939-30MAR2008] ELEV-AVER

No impact to West Point Elevation