

# RECLAMATION

*Managing Water in the West*

**Nebraska-Kansas Area Office**

**Report**

**To The**

**Republican River**

**Compact Administration**

Colby, KS



**U.S. Department of the Interior  
Bureau of Reclamation  
Great Plains Region  
Nebraska-Kansas Area Office**

**September 12, 2013**

## REPUBLICAN RIVER COMPACT MEETING

September 12, 2013  
Colby, Kansas

### 2012 Operations

As shown on the attached Table 1, precipitation in the Republican River Basin varied from 82 percent of normal at Lovewell Reservoir to 49 percent of normal at Hugh Butler Lake. Total precipitation at Reclamation project dams ranged from 9.09 inches at Bonny Dam to 22.54 inches at Lovewell Dam.

Inflows varied from 25 percent of the most probable forecast at Bonny Reservoir to 80 percent of the most probable forecast at Harry Strunk Lake. Inflows into Bonny Reservoir totaled 2,824 AF while inflows at Harlan County Lake totaled 78,581 AF.

Average farm delivery values for total irrigable acres were as follows:

<u>District</u>	<u>Farm Delivery</u>
Frenchman Valley	0.7 inches
H&RW	0.0 inches
Frenchman-Cambridge	7.6 inches
Almena	3.8 inches
Bostwick in NE	11.6 inches
Kansas-Bostwick	11.9 inches

### 2012 Operation Notes

**Bonny Reservoir** – Started the year at elevation 3639.70 feet, 32.3 feet below the top of conservation. This would be the peak reservoir level recorded during the year. The annual computed inflow totaled 2,824 AF and was the lowest ever recorded at this site. River releases were made from January 1<sup>st</sup> through May 17<sup>th</sup> as ordered by the State of Colorado. A total of 2,108 AF was released to the river during this time. Another 18 AF was released into Hale Ditch from May 19<sup>th</sup> through May 22<sup>nd</sup>. The reservoir was drained by the end of May and remained empty for the remainder of the year at approximately 34 feet below the top of conservation (3638.00 feet).

**Enders Reservoir** – Started the year at elevation 3093.27 feet, 19.0 feet below the top of conservation. The 2012 computed inflow totaled 4,509 AF. The reservoir level increased slightly during the spring to a peak elevation of 3094.42 feet on May 1<sup>st</sup>. The conservation pool has not filled since 1968. Due to the extremely low available water supply, no water was released from Enders Reservoir. This was the eleventh consecutive year that H&RW Irrigation District did not divert water. It was also the ninth consecutive year that storage releases were not made for Frenchman Valley Irrigation District. The end of the year

reservoir level was 21.6 feet (3090.71 feet) below the top of conservation.

**Swanson Lake** – Started the year at elevation 2740.20 feet, 11.8 feet below the top of conservation. The annual computed inflow totaled 23,105 AF. The lake level gradually increased to a peak elevation of 2744.03 feet (8.0 feet below the top of conservation) on May 5<sup>th</sup>. The reservoir level decreased during the irrigation season reaching elevation 2733.24 feet on September 1<sup>st</sup>. The district diverted 32,955 AF into Meeker-Driftwood Canal from June 11<sup>th</sup> through August 31<sup>st</sup>. At the end of the year the reservoir level was 19.6 feet below the top of conservation at 2732.41 feet.

**Hugh Butler Lake** – Started the year at elevation 2553.45 feet, 28.4 feet below the top of conservation. The 2012 computed inflow was 10,905 AF. The annual precipitation total of 9.65 inches was the lowest ever recorded at the site. Due to dam safety concerns, releases were made throughout the year to maintain the reservoir elevation between 2552.00 and 2554.00 feet. No irrigation releases were made from Hugh Butler Lake in 2012. The elevation at the end of the year was 2553.63 feet, 28.2 feet below the top of conservation.

**Harry Strunk Lake** – Started the year at elevation 2365.29 feet, only .8 foot below the top of conservation. The annual computed inflow totaled 31,018 AF. Releases were made during the first four months of the year to maintain the pool level. The reservoir was allowed to fill on April 21<sup>st</sup>, and the reservoir level gradually increased to elevation 2366.65 feet on May 5<sup>th</sup>. Irrigation releases dropped the reservoir level to elevation 2349.37 feet on August 28<sup>th</sup>. The district diverted 27,618 AF into Cambridge Canal. Late fall and early winter inflows increased the level of Harry Strunk Lake to 10.1 feet below the top of conservation at the end of the year (2356.0 feet).

**Keith Sebelius Lake** – Started the year at elevation 2298.44 feet, 5.9 feet below the top of conservation. The total 2012 computed inflow was 5,177 AF. The reservoir level slowly increased to elevation 2299.32 feet on May 2<sup>nd</sup>. Irrigation releases were made during June and July reducing the lake level by over 3 feet. The reservoir level continued to gradually decrease the remainder of the year and ended at an elevation of 2293.97 feet (10.3 feet below the top of conservation). A total of 3,172 AF was diverted into Almena Canal.

**Harlan County Lake** – Started the year at elevation 1946.42 feet, .7 foot into the flood pool. The 2012 computed inflow totaled 78,581 AF. River releases varied from 10 to 300 cfs during the first two months of the year and the lake level gradually increased to elevation 1947.20 feet by March 1<sup>st</sup>. The release was staged up to 1,000 cfs on March 5<sup>th</sup> for approximately four days and then staged back down. The elevated release was made to help prevent the Republican River channel from developing areas of vegetation and to re-establish channel capacity. The lake level was maintained near elevation 1946.5 feet through mid May. Irrigation releases started May 21<sup>st</sup> and continued through August 30<sup>th</sup>. The pool level dropped to elevation 1936.38 feet by September 1<sup>st</sup>. Bostwick in Nebraska Irrigation District diverted 45,131 AF in 2012. The reservoir elevation was 1935.28 feet (10.5 feet below the top of conservation) on December 31, 2012. A ten year summary of Harlan County Lake operations is shown on Table 3.

**Lovewell Reservoir** – Started the year at elevation 1581.36 feet, 1.2 feet below the top of

conservation. The pool level gradually increased to elevation 1583.96 feet on May 6<sup>th</sup>. Spring diversions via Courtland Canal into Lovewell Reservoir were not required in 2012. Releases to the canal began on April 27<sup>th</sup> and continued through August 30<sup>th</sup>. The reservoir elevation at the end of the irrigation season was 1572.83 feet. Republican River flow was diverted via Courtland Canal into Lovewell Reservoir through the end of December. The Kansas Bostwick Irrigation District diverted a total of 76,855 AF in 2012. A total of 50,078 AF was diverted into Courtland Canal from Lovewell Reservoir. The reservoir level at the end of the year was 1577.60 feet (5.0 feet below top of conservation).

### Current Operations (As of 7/31/13)

**Bonny Reservoir** – The reservoir is currently empty. Inflows continue to be bypassed through the reservoir as ordered by the State of Colorado. Approximately 1,474 AF has been bypassed through the reservoir in 2013. Bonny Dam has recorded only 8.58 inches of precipitation during the first seven months of the year (74% of average).

**Note** - The Nebraska Department of Natural Resources declared a Compact Call Year on the Republican River Basin on January 1, 2013 and issued storage closing notices on Reclamation reservoirs in the Basin. All water impounded in Swanson Lake, Enders Reservoir, Hugh Butler Lake and Harry Strunk Lake from January 1<sup>st</sup> through April 30<sup>th</sup> was released by May 15, 2013. The compact call remains in place.

**Swanson Lake** – The lake level is 20.8 feet from full and is 6.3 feet below last year at this time. Precipitation for the year is at 84% of normal (11.28 inches). Irrigation releases made in 2013 have been significantly reduced as a result of the compact call placed on the Republican River by the Nebraska Department of Natural Resources.

**Enders Reservoir** - The reservoir level is 22.6 feet below full and 2.7 feet below last year at this time. Enders Dam recorded 10.02 inches of precipitation during the first seven months of the year. Due to the water supply shortage, H&RW Irrigation District is not irrigating for the twelfth year in a row. This is also the tenth consecutive year that Frenchman Valley Irrigation District has not received storage water for irrigation.

**Hugh Butler Lake** – The lake level is currently 27.9 feet below full. The precipitation total so far this year is 8.28 inches (65% of normal). The lake level is 2.0 feet above last year at this time. Irrigation releases are not being made from Hugh Butler Lake this season. Repairs to the dam embankment were completed in 2013 and the reservoir level restrictions have been removed.

**Harry Strunk Lake** – The lake level is currently 11.6 feet below the top of conservation. Precipitation at the dam during the first seven months of the year was 9.37 inches (68% of normal). Irrigation releases were limited during 2013 due to the compact call. The lake level is currently 1.3 feet below last year at this time.

**Keith Sebelius Lake** – Currently 12.8 feet below full. Lake level is 3.7 feet below last year at this time. Irrigation releases were limited during 2013 due to a short water supply.

Precipitation at the dam during the first seven months of the year was 10.86 inches (67% of normal).

**Harlan County Lake** – The current water surface level is approximately 12.5 feet below full. The lake level is 6.7 feet below last year at this time. Harlan County Dam has recorded 10.46 inches of precipitation so far this year (70% of normal). The available irrigation supply from Harlan County Lake on June 30, 2013 was 54,400 AF, indicating that “Water-Short Year Administration” would be in effect. Irrigation releases were impacted by the compact call on the Republican River in 2013.

**Lovewell Reservoir** – The reservoir level is currently 4.8 feet below the top of conservation and 2.5 feet above last year’s elevation at this time. Lovewell Dam recorded 18.36 inches of precipitation during the first seven months of the year (107% of average). Irrigation demands were low in late July and early August due to the wet and cool conditions in the district.

A summary of data for the first seven months of 2013 is shown on Table 2.

### **Other Items**

**Inspections** – Comprehensive Facility Reviews were held at Red Willow and Medicine Creek Dams in July 2012.

**Safety of Dams** – Red Willow Dam – Reconstruction related to the Safety of Dams Modification at Red Willow Dam is essentially complete including placement of a geonet/sand and gravel filtration system along the entire length of the dam.

The filtration system involved placing nearly 115,000 square yards of geonet and geotextile materials, 100,000 cubic yards of sand, and 55,000 cubic yards of gravel. This system was overlain with approximately 431,000 cubic yards of embankment material.

Intersecting the filter at the downstream toe of the dam, a horizontal drain consisting of a layer of gravel and a layer of sand has been constructed. The original pipe drain at the toe of the dam has also been replaced. This filter and drainage system provides valuable protection against internal erosion of the dam embankment.

The contract was modified to include stabilizing the access road, paving the dam crest and repaving the access road. Due to these modifications, the current contract completion date is March 1, 2014; however, SEMA and Reclamation are doing everything possible to complete the contract at an earlier date. Onsite construction is currently scheduled to be completed by the end of October 2013.

**WaterSMART Basin Study Program** - The States of Colorado, Nebraska, and Kansas and the U.S. Department of the Interior, Bureau of Reclamation are working together as study partners to conduct the Republican River Basin Study. This study is part of the U.S. Department of the Interior WaterSMART Basin Study Program. The Republican River Basin

Study area covers the entire Republican River Basin in eastern Colorado, southern Nebraska, and northern Kansas down to the Clay Center gauging station in Kansas.

This two-year Study will evaluate the viability of water management strategies to optimize surface and groundwater use in consideration of meeting multiple demands and the potential effects of climate change/variability. It will:

- Project future supply and demand in the Republican River Basin.
- Analyze how existing water operations and infrastructure will perform in the face of uncertain or variable water supply and/or demands.
- Identify and evaluate options to improve operations and infrastructure to address future water supply needs.
- Recommend options (operations and infrastructure) to supply adequate water in the future.

**TABLE 1**  
**NEBRASKA-KANSAS PROJECTS**  
**Summary of Precipitation, Reservoir Storage and Inflows**  
**CALENDAR YEAR 2012**

Reservoir	Total Precip. Inches	Percent Of Average %	Storage 12-31-11 AF	Storage 12-31-12 AF	Gain or Loss AF	Maximum Content AF	Storage Date	Minimum Content AF	Storage Date	Total Inflow AF	Percent Of Most Probable %
Box Butte	7.53	44	15,464	8,308	-7,156	20,318	MAY 5	5,895	AUG 10	9,464	60
Merritt	10.26	50	61,370	61,370	0	67,602	MAY 27	28,186	AUG 26	180,654	98
Calamus	11.78	49	105,099	87,136	-17,963	128,067	APR 28	41,366	OCT 1	268,633	98
Davis Creek	13.78	56	9,280	18,954	9,674	24,455	JUN 15	6,003	SEP 16	63,860	130
Bonny	9.09	53	135	0	-135	135	JAN 1	0	MAY 31	2,824	25
Enders	12.29	65	17,484	15,122	-2,362	18,649	MAY 1	14,956	NOV 26	4,509	43
Swanson	12.94	65	62,156	37,797	-24,359	75,222	MAY 5	36,440	DEC 13	23,105	70
Hugh Butler	9.65	49	5,993	6,098	105	6,097	DEC 31	4,915	SEP 29	10,905	74
Harry Strunk	12.00	58	33,098	19,939	-13,159	35,670	MAY 5	12,977	AUG 28	31,018	80
Keith Sebelius	15.29	62	23,218	16,462	-6,756	24,737	MAY 2	16,259	DEC 12	5,177	56
Harlan County	18.14	80	322,964	191,125	-131,839	335,503	FEB 29	190,305	DEC 12	78,581	55
Lovewell	22.54	82	31,938	22,585	-9,353	39,868	MAY 6	12,249	AUG 24	50,040	77
Kirwin	11.96	51	99,989	66,348	-33,641	99,989	JAN 1	65,713	NOV 13	21,535	65
Webster	16.92	72	58,196	36,167	-22,029	65,230	MAY 5	36,095	DEC 13	11,090	42
Waconda	19.99	78	211,190	184,545	-26,645	224,622	MAY 1	181,996	OCT 12	109,096	60
Cedar Bluff	14.97	71	79,365	66,233	-13,132	79,365	JAN 6	66,233	DEC 29	5,247	27

**TABLE 2**  
**NEBRASKA-KANSAS AREA OFFICE**  
**Summary of Precipitation, Reservoir Storage and Inflows**

**JANUARY - JULY 2013**

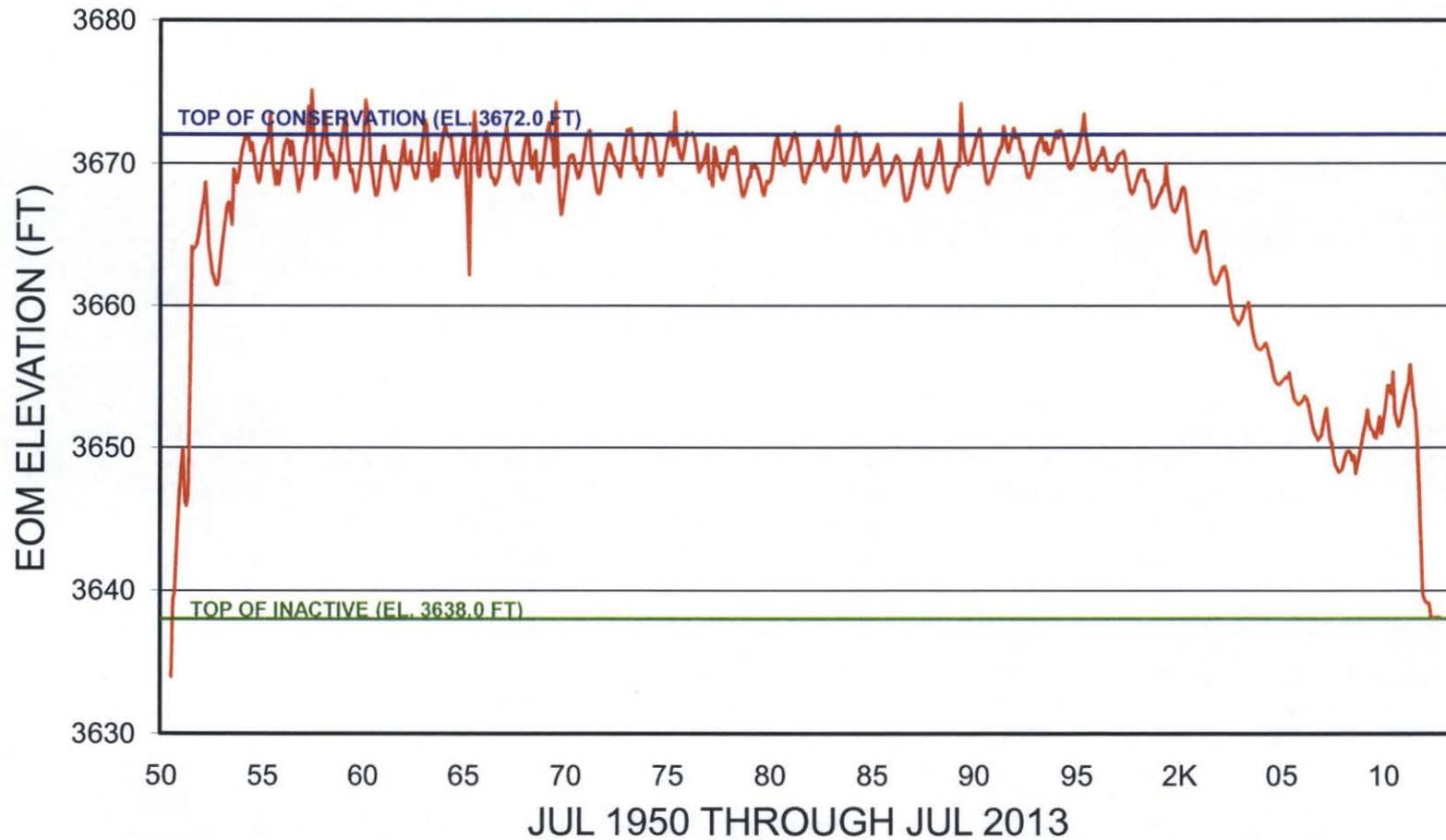
Reservoir	Precip. Inches	Percent Of Average %	Storage 7/31/2012 AF	Storage 7/31/2013 AF	Gain or Loss AF	Inflow AF	Percent Of Most Probable %
Bonny	8.58	74	0	0	0	1,474	19
Enders	10.02	78	16,705	14,283	(2,422)	3,040	53
Swanson	11.28	84	52,999	33,333	(19,666)	16,389	67
Hugh Butler	8.28	65	5,142	6,274	1,132	6,569	71
Harry Strunk	9.37	68	19,737	18,240	(1,497)	20,859	81
Keith Sebelius	10.86	67	18,270	13,379	(4,891)	3,405	53
Harlan County	10.46	70	241,599	170,539	(71,060)	44,387	44
Lovewell	18.36	107	17,768	23,062	5,294	39,272	92

**TABLE 3  
HARLAN COUNTY LAKE**

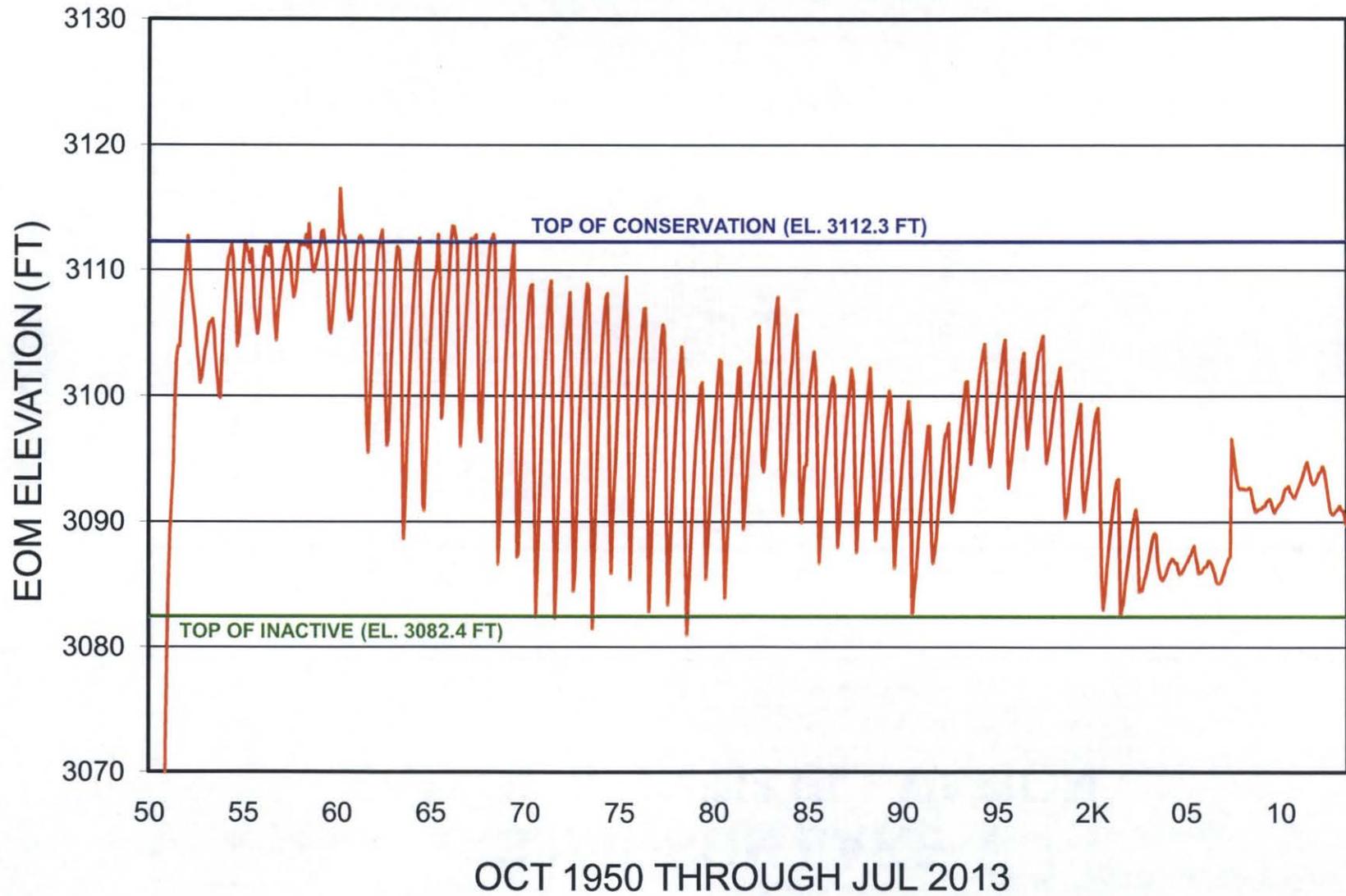
Year	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Precip. (% of Average) (22.76 inches)	Rep. Basin Reclamation Dams (% of Average)	End of Year Content (AF)	Projected Irrig. Water Supply On June 30th (AF)
2003	48,430	51,237	34,307	16.70	73%	93%	113,346	<b>62,000</b>
2004	25,099	0	30,601	22.83	100%	111%	107,050	<b>0</b>
2005	53,682	0	32,620	22.51	99%	107%	128,111	<b>14,100</b>
2006	30,077	12,280	29,609	20.62	91%	101%	116,299	<b>14,400</b>
2007	198,528	21,237	38,197	26.92	118%	114%	255,393	<b>111,700</b>
2008	224,841	114,938	45,985	30.31	133%	131%	319,311	<b>175,900</b>
2009	136,747	94,079	41,721	24.50	108%	128%	320,258	<b>156,000</b>
2010	239,054	194,055	46,893	31.66	139%	119%	318,364	<b>147,800</b>
2011	174,830	120,989	49,241	30.69	135%	115%	322,964	<b>157,700</b>
2012	78,581	160,221	50,199	18.14	80%	64%	191,125	<b>132,900</b>

\*NOTE: On June 30, 2013 Projected Irrig. Water Supply was 54,391 AF.

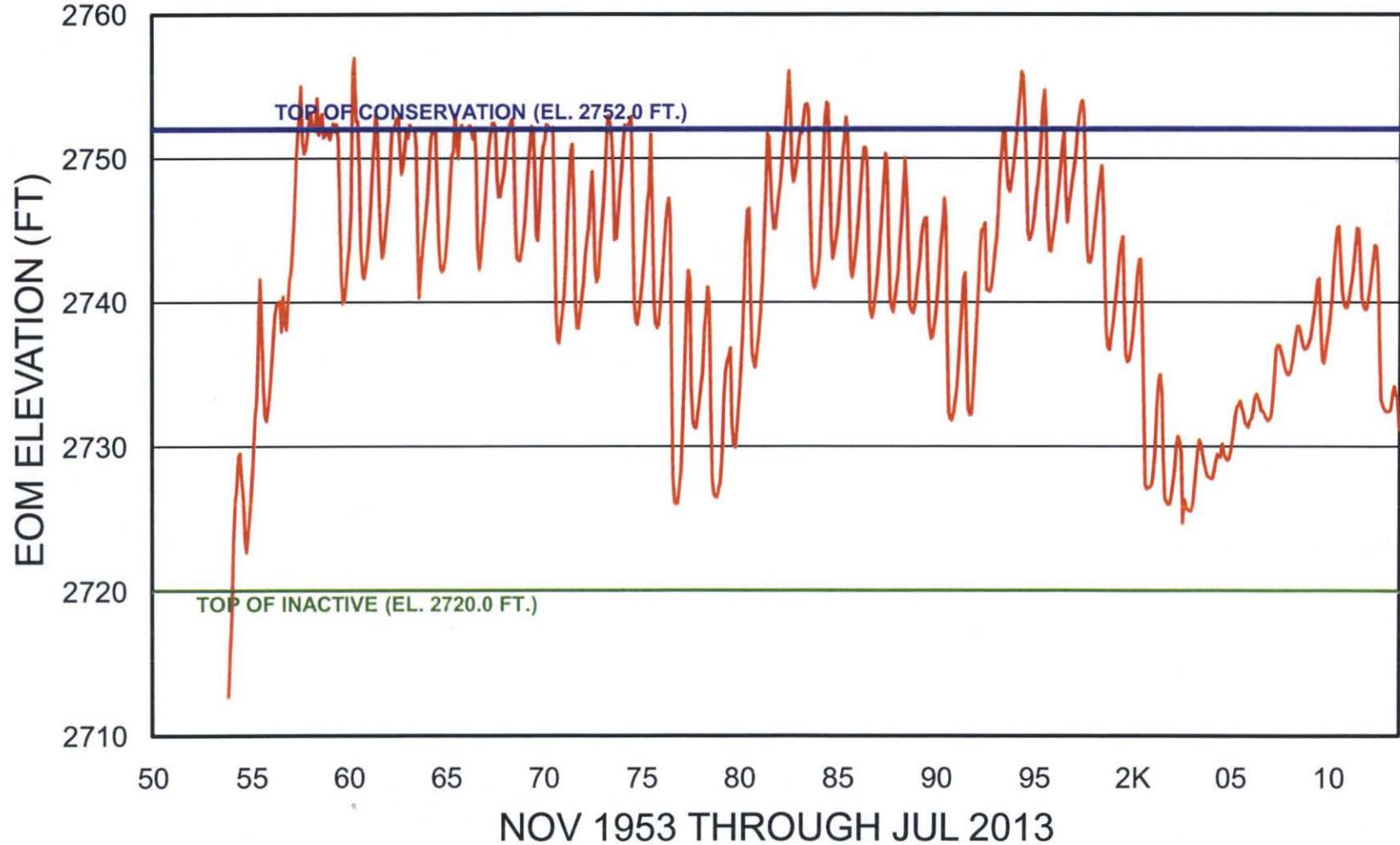
# BONNY RESERVOIR END OF MONTH ELEVATION



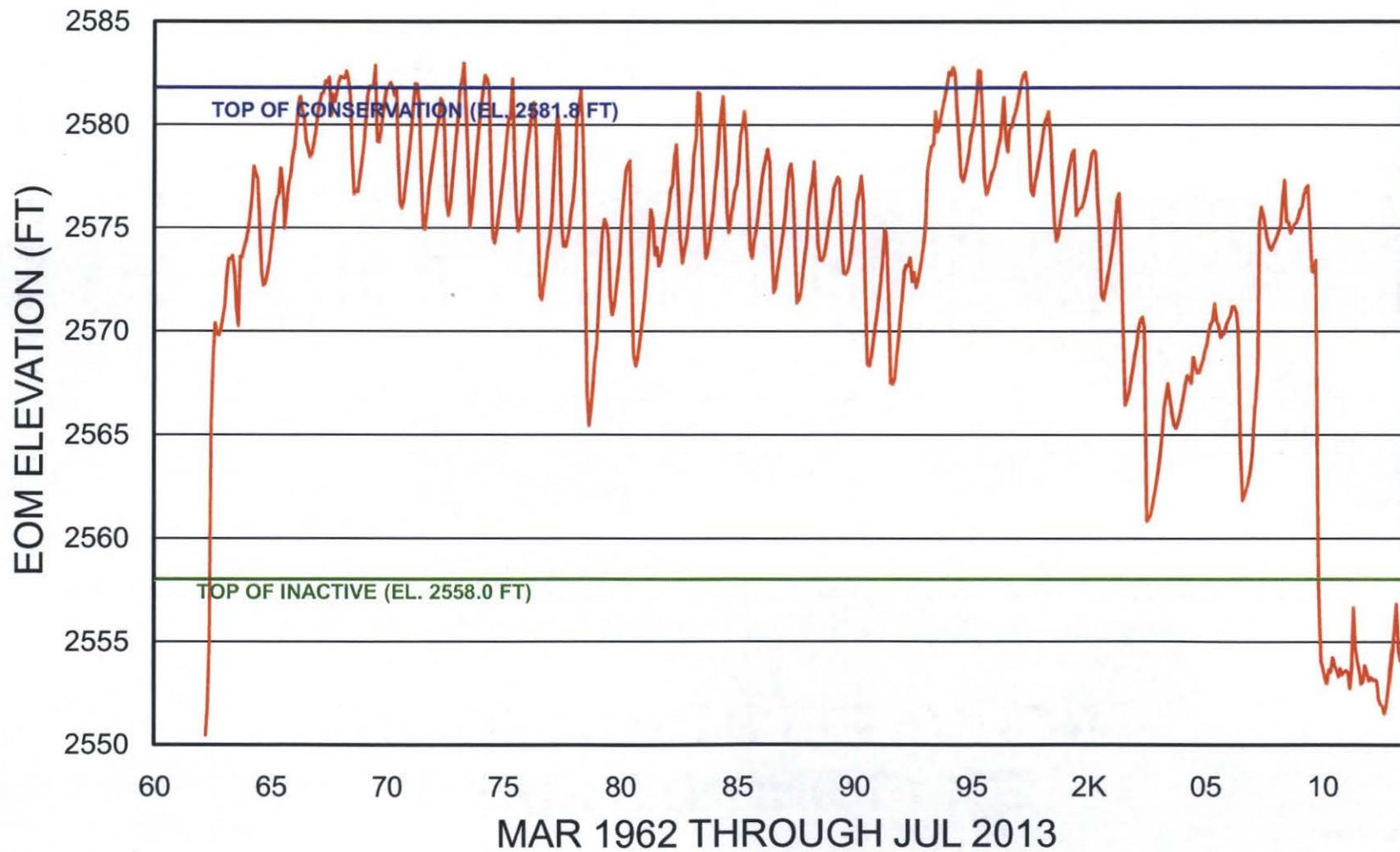
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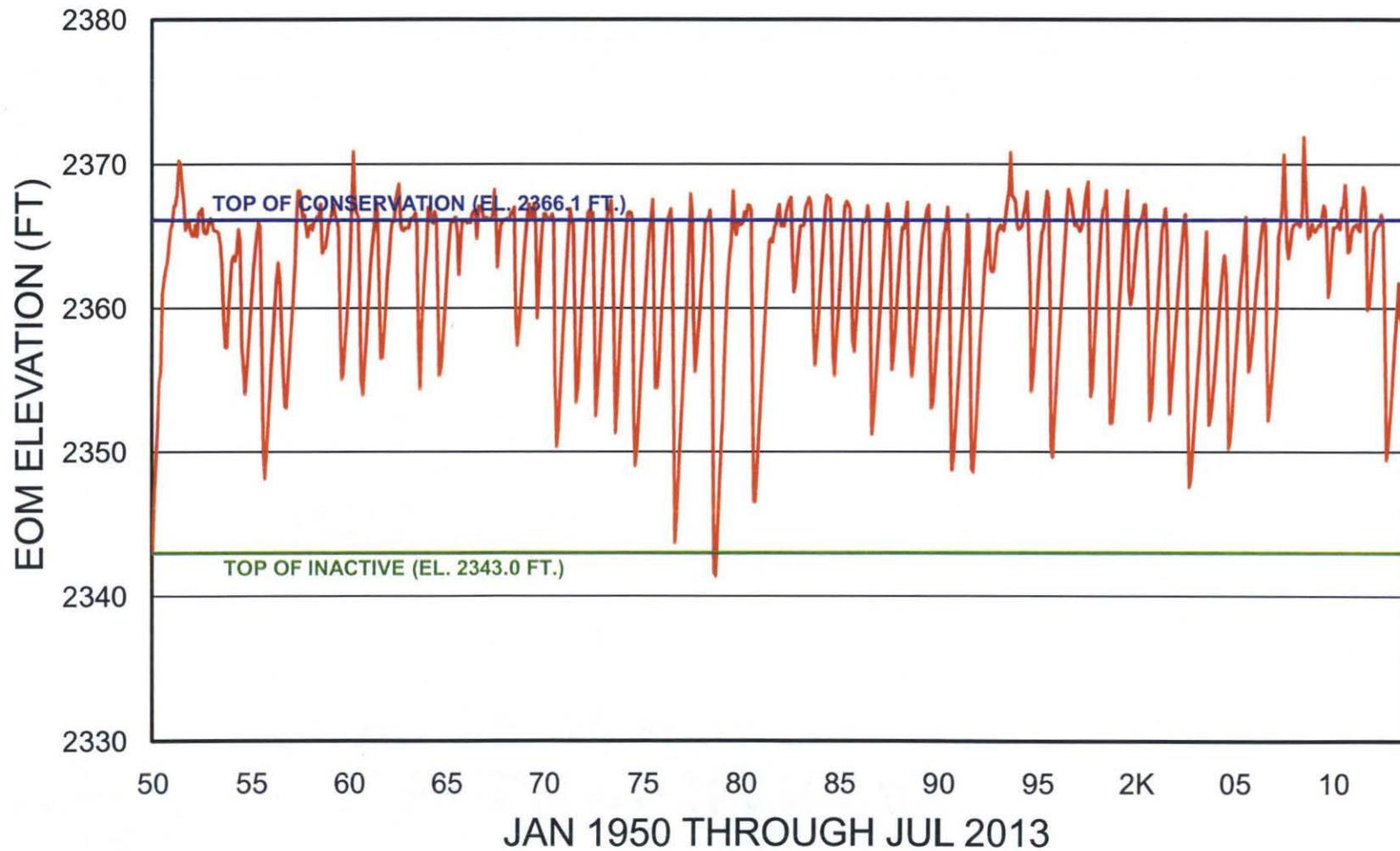
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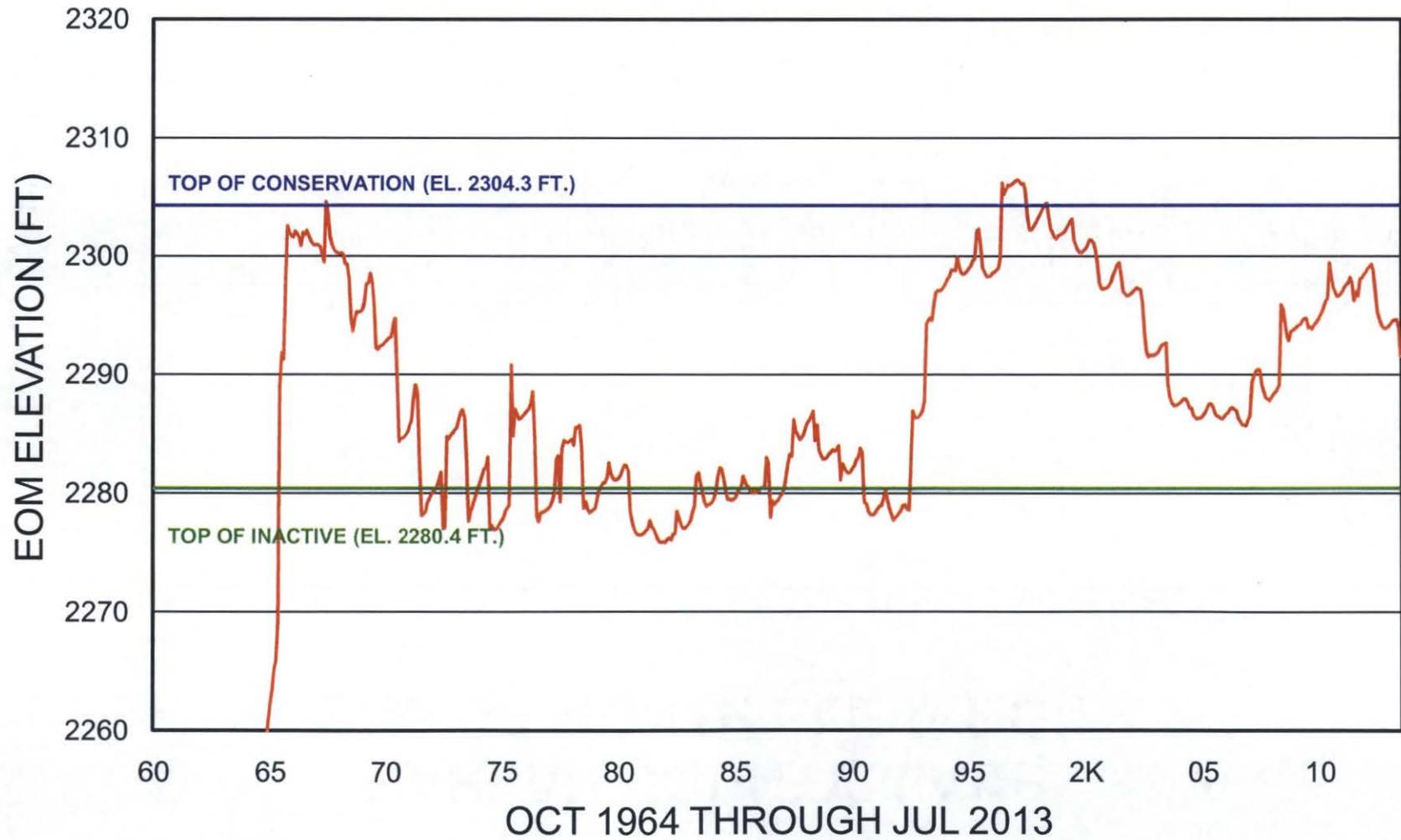
# HUGH BUTLER LAKE END OF MONTH ELEVATION



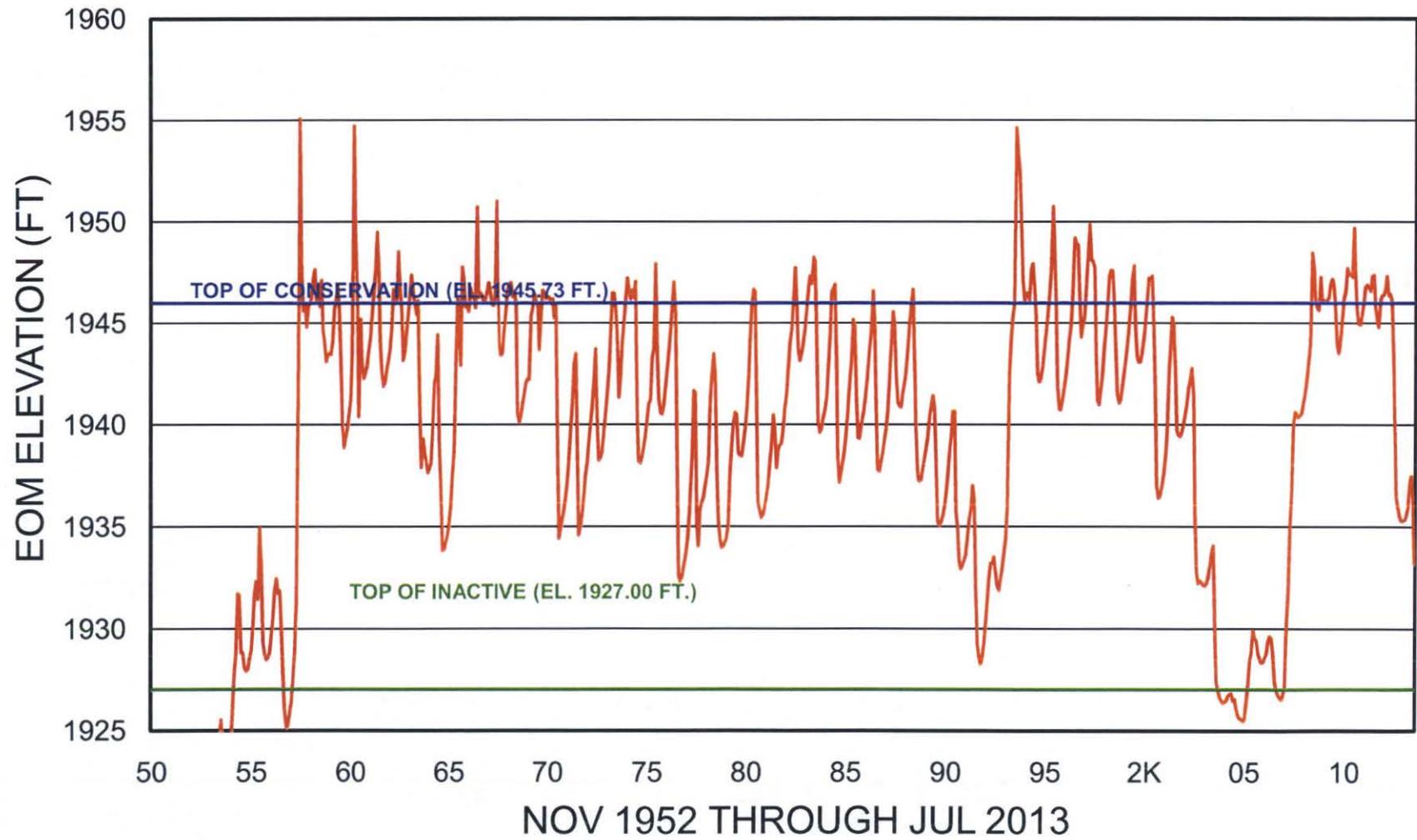
# HARRY STRUNK LAKE END OF MONTH ELEVATION



# KEITH SEBELIUS LAKE END OF MONTH ELEVATION



# HARLAN COUNTY LAKE END OF MONTH ELEVATION



# LOVEWELL RESERVOIR END OF MONTH ELEVATION

