VOLUMETRIC SURVEY REPORT

OF

EUFAULA LAKE

JUNE 2004 SURVEY

Prepared by the:

TEXAS WATER DEVELOPMENT BOARD



April 2006

Texas Water Development Board

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Executive Summary

This report presents the results if a volumetric survey conducted by the Texas Water Development Board on Eufaula Lake, Oklahoma under contract with the U.S. Army Corps of Engineers, Tulsa District (Contract No. W44GQ41965861). The purpose of that survey was to collect hydrographic data when the reservoir was at or above power pool elevation (585.0 ft) and to provide updated elevation-area and elevation-volume tables up to power pool elevation. Analysis of the survey data indicates that Lake Eufaula contains a volume of 2,144,315 ac-ft at power pool elevation 585.5 ft and encompasses a surface area of 94,526 ac.

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Introduction

In June 2004, the Texas Water Development Board (TWDB) and the United States Army Corps of Engineers (USACE), Tulsa District, entered into a Memorandum of Agreement whereby the TWDB would perform a volumetric survey of Eufaula Lake. The purpose of that survey was to collect hydrographic data when the reservoir was at or above power pool elevation (585.0 ft) and to provide updated elevation-area and elevation-volume tables up to the power pool elevation. In addition, the TWDB survey team digitized and plotted historical (1964 and 1969) sedimentation ranges against ranges interpolated from the current survey (TWDB 2004).

History and General Information

Eufaula Dam is located on the Canadian River, approximately 12 miles east of Eufaula in McIntosh County, Oklahoma (Figure 1). The lake is owned and operated by the U.S. Army Corp of Engineers, Tulsa District, and impounds the North Canadian River, Canadian River, Deep Fork of the Canadian River, Gaines Creek, and several smaller creeks. The lake provides flood control, water supply, hydroelectric power, fish and wildlife habitat, and recreation.²



Figure 1. Eufaula Lake is located in eastern central Oklahoma.

Construction on Eufaula Dam began in December 1956 and was completed for full flood control on February 10, 1964. Power generation began in July 1964 with the last of three generators coming online for commercial power in September of 1964. Elevations of pertinent features are presented below in Table 1.

Feature	Elevation (feet)
Top of Dam	612.0
Maximum Pool	604.5
Top of Gates and	597.0
Flood Control	397.0
Flood Control	585.0-597.0
Storage	363.0-397.0
Top of Power Pool	585.0
(TOP)	363.0
Power Storage	565.0-585.0
Bottom of Power	
Pool and Spillway	565.0
Crest	

Table 1. Elevation of Pertinent Features for Eufaula Dam.

Results of the TWDB 2004 Survey

The current survey indicates that at the top of power pool elevation, 585.0 ft, Eufaula Lake contains a total volume of 2,144,315 ac-ft and a surface area of 94,526 ac. Table 2 presents the 2004 survey results and results from two previous USACE surveys in 1964 and 1969. Due to the different computational methods used in previous surveys direct comparisons are not recommended³ and are presented here solely for informational purposes.

Feature	TWDB 2004	USACE 1969	USACE 1964
Volume (TOP) 585.0 ft	2,144,315	2,330,000	2,378,000
Area (TOP) 585.0 ft	94,526	102,200	102,500
Power Storage (585ft-565ft)	1,346,325	1,465,200	1,481,000
Bottom of Power Pool 565ft	797,990	864,800	897,000

Table 2. Elevations, Areas, and Volumes from the TWDB 2004 survey and previous USACE surveys.

Methods

Pre-Survey Procedures

Survey team members defined preliminary reservoir and island boundaries from aerial photographs by digitizing the visible land-water interface. Sixty-two aerial photographs, obtained from USACE Tulsa District and GEO Information Systems⁴, were used in the digitization process. Once the boundary was established, the survey team designed a set of pre-planned navigation lines spaced 500 feet apart in a perpendicular fashion to the original streambed. During data collection, team members navigated from shore to shore along these lines (Figure 2).

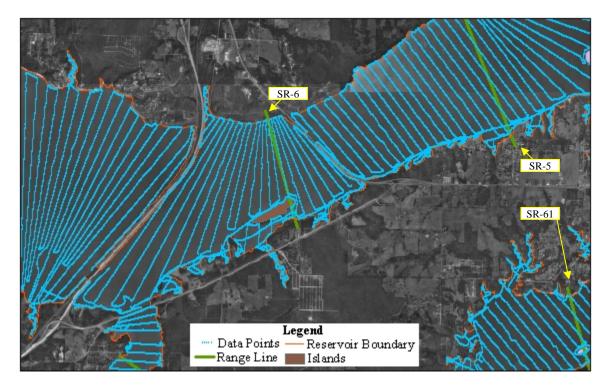


Figure 2. Data points superimposed on the 1995 aerial photographs illustrate the pattern of the pre-planned navigation lines. At the top of the picture, U.S. Highway 69 and State Highway 9 are visible entering the city of Eufaula from the south. Green lines are the approximate locations of USACE Sediment Range Lines established prior to 1964.

Hydrographic Survey

Bathymetric survey data was collected using integrated Differential Global Positioning System (DGPS) equipment and survey grade depth sounders. For this survey, three boats were equipped with similar systems providing an efficient and accurate method to collect data in varying conditions encountered throughout the reservoir.

Depth sounders were calibrated each day using velocity profilers to measure the average speed of sound through the water column. The speed of sound was entered into the depth sounder and depth readings were checked for accuracy with a weighted tape or stadia rod.

The survey team collected data on 38 days from July 22, 2004 to September 20, 2004, during that time the water surface elevation varied between 587.64 ft and 585.32 ft. The team navigated more than 2,300 miles while collecting over 1,152,000 data points. After post processing the data to remove anomalies, the water surface elevation for each day was used to correct all data and all files were combined into a single (MASS Points) file to be used in the GIS processing.

GIS Processing

Datum

The vertical datum used for this survey is referenced to the USACE Gauge⁵ EUFO2. In order to monitor any variations in water surface elevation during the survey, four pressure transducers were placed on bridge pilings throughout the reservoir. Analysis of the pressure transducer data indicates that the water surface elevation was consistent throughout the reservoir during the survey. Therefore, the measurements at the gauge (EUFO2) were used to adjust the depth readings for the complete survey data set. A complete description of the process used in the analysis of the pressure transducer data is provided in Appendix A. The horizontal datum used in this report is Oklahoma State Plane NAD 1983.

Model Boundary

As discussed earlier, a preliminary reservoir boundary was digitized from aerial photographs. However, the water surface elevation varies from photograph to photograph

April of 1995. The reservoir's elevation for each of the photographs was determined using data from the USACE Gauge EFUO2, and is summarized in Table 3. Five line segments were digitized around Eufaula Lake and assigned an elevation corresponding to the appropriate elevation of the land-water interface in each photograph. To simplify the final processing, the five elevations listed in Table 3 were rounded to three elevations, 585.0 ft, 585.3 ft, and 586.8 ft. and the line segments were combined accordingly.

The Triangular Irregular Network (TIN) Model⁶ routine used to make volume and area calculations requires the boundary to be a closed polygon with a unique water surface elevation. Since the aerial photography provided us with three line segments with varying elevations, another boundary was created. To accomplish this, a boundary using the 180-meter (590.6 ft) contour, from the 1:24,000 scale hypsography⁷, was created to encompass the three line segments digitized from the aerial photographs. The aerial photography has a scale of 1:12,000, while the hypsography has a scale of 1:24,000. Due to the scale differential between these two GIS layers, estimation of the true position of elevation 590.6 ft was necessary therefore, elevation-volume and elevation-area calculations above 585.0 ft are not included in this report.

Table 3. Aerial Photographs Dates and Corresponding Reservoir Elevation

Number of	Date of	Reservoir
Photographs	Photographs	Elevation (ft)
13	2/24/1995	584.99
14	3/9/1995	585.33
17	3/10/1995	585.29
14	3/21/1995	586.78
4	4/01/1995	585.07

TIN

The data points (MASS Points file), line segments defining the land-water interface, and the outer boundary polygon, were input into the TIN routine to model the reservoir's bathymetry. Using this model, volumes and areas were calculated at one-tenth foot intervals from the minimum depth recorded during the survey, 491.8 ft; to the power pool elevation of 585.0 ft. Elevation volume and elevation area tables and graphs are presented in Appendix B through E. In addition, the TIN model was averaged into 50-foot

grids to create an Elevation Relief Map (Figure 4), Depth Range Map (Figure 5) and a 4-foot interval contour map (Figure 6).

Historical Sediment Range Lines

Historical Sediment Range Line locations were selected from a 1969 intermediate-scale map (approximately 1:120,000) entitled "SILT RANGES". The map was scanned and geo-referenced using the 1995 aerial photographs. Range line endpoint coordinates were then estimated from the map; however, horizontal positional inaccuracies are present due to the scale differential and the condition of the paper map. These positional inaccuracies are evident in the cross-sectional comparisons between the 1969 range lines and the interpolated ranges of 2004, presented in Appendix F. This report assumes that the vertical datum at gauge EUFO2 is the same as that used to establish the range lines. Figure 3 details a portion of the 1969 map overlain with the boundary segments to show the horizontal inaccuracies.

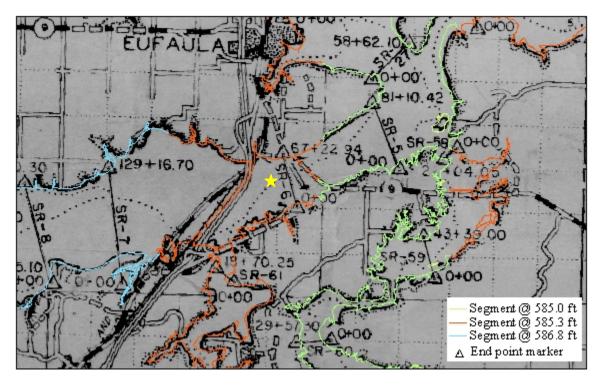


Figure 3. A portion of the 1969 map after geo-referencing, with the line segments digitized from the aerial photography. Notice the proposed roads near SR-6, (★) near the center. Variations in the cross-sections in these areas are most likely due to road and bridge construction since 1969.

References

- 1) Eufaula Lake, Report on June 1969 Resurvey of Sedimentation and Degradation Lines, Department of the Army, Tulsa District Corps of Engineers, Oklahoma, May 1977.
- United States Army Corps of Engineers, Tulsa District, Reservoir Control Office, May 7, 1997,
 http://www.swt.usace.army.mil/projects/pertdata/eufaula/eufaula.htm, August 2005.
- 3) Blanton III, James O. Bureau of Reclamation. 1982. "Procedures for Monitoring Reservoir Sedimentation."
- 4) Geo Information Systems, a department of the University of Oklahoma, 2020 Industrial Boulevard, Second Floor, Norman Oklahoma. 73069-8512
- 5) United States Army Corps of Engineers, Tulsa District, Reservoir Control Office. August 2005 http://www.swt-wc.usace.army.mil/webdata/gagedata/EUFO2.current.html. August 2005.
- 6) ESRI, Environmental Systems Research Institute, 1995. ARC/INFO Surface Modeling and Display, TIN Users Guide.
- 7) United States Geological Survey. 1:24,000 DLG Hypsography. http://edc.usgs.gov/geodata/dlg_large/states/OK.html September 2005

Appendix A

Hydrographic Survey of Eufaula Lake, OK

GPS Measurement Report

Prepared by Jordan Furnans Texas Water Development Board February 25, 2005 Purpose of Measurements:

As part of its hydrographic survey of Eufaula Lake, the Texas Water Development Board

was required to produce a bathymetry dataset containing the elevation above mean sea level

for all points within the lake. To create this dataset, water depths were measured with boat-

mounted sonar equipment, and lake bottom elevation is calculated by subtracting the water

depth from the water surface elevation measured with the Eufaula Lake dam gauge. The

elevation at the top of Eufaula Dam was determined to be 612 ft, and (at time of publication)

no records are available that describe the procedures used to determine this elevation. It is

also unclear as to the values of the gauge datum, or exactly where the water level

measurements are made. There is a type of staff gauge built into the side of the dam, where

the elevation markings are fixed in the dam concrete.

GPS equipment and surveying techniques were used to verify the elevation of the dam, of the

water surface near the dam, and of the water surfaces at 4 locations within the lake. These

locations were near where pressure transducers (PTs) were installed to record water level

changes during the period of the hydrographic survey. The GPS measurements were tied-in

to the local National Geodetic Survey benchmark system by referencing the known

elevations at two benchmarks along Highway I-40.

This document serves as notice for how the GPS measurements were made, how the data was

processed, and how the final dam and water surface elevation values were obtained.

Surveyor in charge: Jordan Furnans, Texas Water Development Board

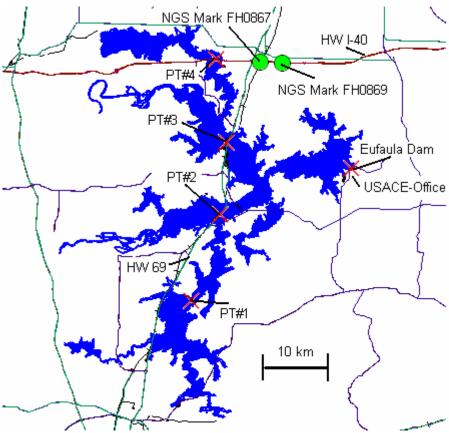


Figure 1 – Map of Eufaula Lake showing locations of benchmarks (Green Circles), locations of water level measurements (Red X's), and USACE Office.

GPS measurements were made according to the plan presented on the following page. A full GPS loop was created by setting the base station near FH0867 on 7/20/04, taking rover shots including one at the temporary mark at the USACE Office, setting the base station at the temporary mark at the USACE Office on 7/21/04, and taking rover shots including one at the location near FH0867 where the base station was located on the previous day. It was not possible to set the base station at FH0867 because the mark is immediately next to a wooden utility pole that could block some satellite signals. A level and stadia rod was used to determine the elevation difference between FH0867 and the location at which the GPS measurements were made near that mark. On 7/23/04, GPS measurements were made in order to determine the water surface elevation near PT#2. This measurement was not made on 7/21/04 because the batteries supplying power to the base station had drained before the rover shot was taken at PT#2. This prevented making simultaneous measurements with the base and rover when at PT#2 on 7/21/04.

Completed GPS Measurement Plan:

7/20/04

- Locate suitable NGS Benchmarks Found FH0867, FH0869
- Set Up Base Station (Trimble 5700) near FH0867, use level to determine elevation at base station location (FH0867 was near a large wooden pole that could impede the GPS measurement; Randy Burns of TWDB held the stadia rod during the level shot)
- Take GPS Measurements with Rover (Trimble 5800) at point FH0869, at USACE benchmark "Eufaula Res. G3 -1988" on Eufaula Dam, and at temporary location on grounds of USACE office. Temporary location = center of manhole near front gate of USACE Eufaula Lake office. Exact position marked with an "X" on the manhole, using a pocketknife.
- Retrieve all Equipment

7/21/04

- Set Up Base Station (Trimble 5700) at temporary location on grounds of USACE office, at the manhole cover on the "X".
- Take GPS Measurements with Rover (Trimble 5800) at USACE benchmark "Eufaula Res. G3 -1988" on Eufaula Dam, at the water surface in the vicinity of the dam, at FH0869, at point of previous base setup near FH0867, at water surfaces near PT#1, PT#2, PT#3, PT#4
- Retrieve all Equipment

7/23/04

- Set Up Base Station (Trimble 5700) at temporary location on grounds of USACE office, at the manhole cover on the "X".
- Take GPS Measurements with Rover (Trimble 5800) at water surface near PT#2
- Retrieve all Equipment

7/27/04

 Process GPS measurement data using Trimble Geomatics Office Software, upon returning to TWDB office in Austin, TX.

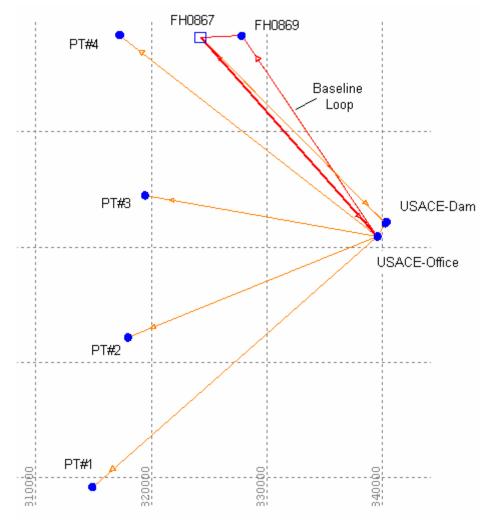


Figure 2 – Screen Capture from Trimble Geomatics Office Software – Processing GPS data. Complete Baseline Loop was formed between USACE-Office, FH0867, and FH0869. Elevation was fixed at FH0867 and used to determine elevations at each of the other measurement locations.

Table 1 – Elevations Derived from GPS Measurements

GPS Point	GPS Height (m)	Geoid (m)	Elevation (m)	Elevation (ft)
USACE-office	193.357	30.3	223.65±0.03	733.78±0.10
FH0869	155.736	29.84	185.57±0.04	608.84±0.12
FH0867	168.843	29.80	198.65±0.00	651.74±0.00
USACE-dam	156.499	30.28	186.78±0.03	612.80±0.10
dam-wse	148.877	30.28	179.15±0.04	587.78±0.12
PT1	148.867	30.18	179.05±0.09	587.44±0.30
PT2	149.021	30.11	179.13±0.10	587.70±0.33
PT3	149.197	29.96	179.16±0.07	587.79±0.24
PT4	149.416	29.73	179.15±0.06	587.77±0.18

^{***} At time of dam-wse measurement, dam gauge recorded 578.70 ft, within the error limits of this GPS survey.

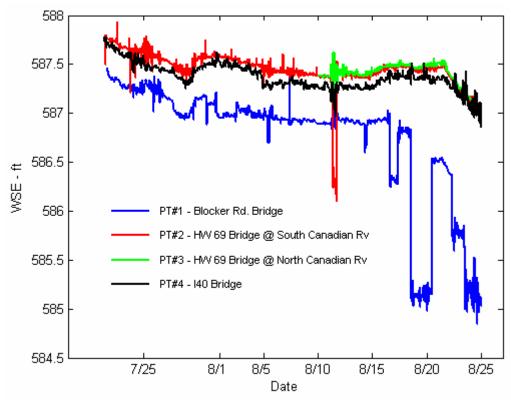


Figure 3- Water Surface Elevations (WSEs) measured with the PTs.

Water surface elevations were calculated by adding the depths measured by the PTs to the known elevations of the PTs. The PT elevations were calculated by subtracting the measured depth to the PT at the time of the GPS measurements of the water surface elevations. The time-histories of water surface elevations (Figure 3) exhibit similar trends among the four locations. PT #1 was disturbed after 8/15, causing the 2-ft drop in WSE recorded. PT#3 did not record valid data until 8/10. Given the error in the GPS recorded PT elevations (Table 1), WSE elevation differences cannot be discerned amongst the 4 PT locations.

Conclusion: the water surface elevation of Lake Eufaula changed uniformly during the hydrographic survey data collection, and that the gauge at the dam is sufficient for determining lake surface elevations throughout the lake.

Appendix B

Eufaula Lake RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD

547

296,223

297,994

299,774

301,560

303,356

305,158

SEPTEMBER 2004 SURVEY Power Pool Elevation 585.0 ft

306,969

308,788

310,614

312,449

	VOLUME IN ACRE-FEET ELEVATION INCREMENT IS ONE TENTH FOOT								ıΤ	
ELEVATION		VOLONIE IIV	OKE LEE			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			•	
in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
491									0	0
492	0	0	0	0	0	0	0	0	0	0
493	0	0	0	0	0	0	0	0	0	0
494	0	0	0	0	0	0	0	0	0	0
495	0	0	0	0	0	0	1	1	1	1
496	1	1	1	1	1	1	1	2	2	2
497	2	2	2	2	3	3	3	3	3	4
498	4	4	4	5	5	5	6	6	6	7
499	7	8	8	8	9	9	10	10	11	12
500	12	13	14	14	15	16	17	17	18	19
501	20	21	22	23	24	26	27	28	30	31
502	33	35	37	39	42	45	48	51	55	59
503	63	68	73	79	84	91	97	104	112	120
504	128	137	146	156	166	177	189	201	214	228
505	242	257	272	288	305	323	341	360	380	401
506	423	446	469	494	519	546	574	602	632	662
507	694	726	760	794	830	866	904	943	983	1,024
508	1,065	1,108	1,152	1,197	1,244	1,291	1,339	1,388	1,438	1,490
509	1,542	1,596	1,651	1,708	1,765	1,824	1,884	1,946	2,009	2,074
510	2,141	2,209	2,279	2,351	2,425	2,500	2,577	2,655	2,736	2,818
511	2,903	2,990	3,079	3,171	3,265	3,361	3,460	3,562	3,666	3,772
512	3,880	3,991	4,105	4,221	4,340	4,461	4,586	4,714	4,845	4,980
513	5,118	5,260	5,406	5,556	5,709	5,867	6,028	6,194	6,362	6,535
514	6,712	6,892	7,076	7,265	7,458	7,655	7,857	8,065	8,276	8,493
515	8,716	8,943	9,177	9,415	9,659	9,907	10,161	10,421	10,687	10,959
516	11,238	11,522	11,812	12,108	12,411	12,719	13,033	13,353	13,678	14,009
517	14,345	14,686	15,032	15,382	15,738	16,098	16,462	16,831	17,204	17,582
518	17,963	18,348	18,737	19,129	19,525	19,925	20,328	20,736	21,146	21,561
519	21,980	22,402	22,828	23,257	23,690	24,126	24,565	25,007	25,452	25,900
520	26,350	26,804	27,259	27,718	28,178	28,641	29,106	29,574	30,043	30,515
521	30,989	31,466	31,945	32,426	32,909	33,395	33,882	34,372	34,863	35,357
522	35,853	36,351	36,852	37,354	37,859	38,366	38,876	39,388	39,903	40,421
523	40,940	41,463	41,988	42,516	43,046	43,579	44,114	44,652	45,192	45,735
524	46,280	46,828	47,378	47,931	48,487	49,045	49,606	50,171	50,738	51,308
525	51,881	52,457	53,037	53,619	54,204	54,793	55,385	55,980	56,578	57,180
526	57,785	58,393	59,006	59,622	60,242	60,867	61,495	62,127	62,763	63,402
527	64,046	64,693	65,344	65,998	66,657	67,320	67,986	68,657	69,332	70,012
528		71,385	72,079	72,777	73,481	74,189	74,902	75,621	76,345	77,076
529		78,552	79,299	80,050	80,808	81,570	82,338	83,112	83,891	84,675
530		86,258	87,058	87,862	88,673	89,487	90,307	91,132	91,962	92,797
531		94,481	95,331	96,186	97,045	97,909	98,777	99,651	100,530	101,415
532		103,199	104,100	105,005	105,917	106,833	107,753	108,679	109,608	110,542
533		112,424	113,372	114,324	115,281	116,242	117,206	118,175	119,148	120,126
534		122,091	123,081	124,074	125,072	126,073	127,078	128,087	129,100	130,117
535		132,162	133,191	134,223	135,260	136,300	137,345	138,395	139,449	140,509
536		142,641	143,715	144,794	145,878	146,967	148,062	149,162	150,268	151,380
537		153,621	154,752	155,888	157,031	158,180	159,335	160,498	161,667	162,843
538		165,212	166,408	167,609	168,817	170,032	171,252	172,479	173,712	174,950
539		177,441	178,696	179,955	181,221	182,492	183,767	185,050	186,337	187,630
540		190,235	191,548	192,867	194,193	195,526	196,865	198,212	199,565	200,926
541		203,666	205,047	206,433	207,827	209,226	210,631	212,043	213,459	214,883
542		217,746	219,188	220,634	222,089	223,548	225,013	226,485	227,962	229,446
543		232,430	233,931	235,439	236,953	238,474	240,002	241,539	243,082	244,633
544		247,756	249,330	250,910	252,498	254,092	255,695	257,306	258,924	260,550
545		263,821	265,467	267,120	268,780	270,445	272,118	273,798	275,483	277,176
546 547		280,579 207,004	282,292	284,010 301 560	285,735 303 356	287,466 305,158	289,204	290,949	292,700 310,614	294,459
K/1/1	10k 1111	/4/ (1(1/)	/44 / //	4111 6611	4114 766	4115 750	KI IID LIGHTI	4118 700	4311 637	41 / /////

Appendix B (continued)

Eufaula Lake RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD

SEPTEMBER 2004 SURVEY

Power Pool Elevation 585.0 ft ELEVATION INCREMENT IS ONE TENTH FOOT

		VOLUME IN A	CDE-EEET		EI E\	EVATION INCREMENT IS ONE TENTH FOOT				
ELEVATION		VOLUME IN A	CIXL-I LL I			ATION INCIN	LIVILIVI IS OIV	LILINIIIIO	<i>3</i> 1	
in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
548	314,291	316,141	317,999	319,863	321,736	323,615	325,502	327,399	329,302	331,214
549	333,133	335,060	336,997	338,942	340,896	342,857	344,828	346,809	348,798	350,796
550	352,802	354,817	356,843	358,877	360,921	362,973	365,035	367,109	369,191	371,286
551	373,389	375,504	377,631	379,768	381,919	384,080	386,254	388,442	390,640	392,853
552	395,076	397,312	399,562	401,822	404,095	406,379	408,673	410,981	413,298	415,629
553	417,971	420,325	422,693	425,072	427,466	429,872	432,291	434,725	437,170	439,629
554	442,099	444,582	447,079	449,587	452,108	454,641	457,185	459,744	462,314	464,898
555	467,493	470,099	472,719	475,349	477,992	480,646	483,311	485,990	488,678	491,379
556	494,089	496,810	499,544	502,287	505,042	507,807	510,583	513,370	516,167	518,976
557	521,793	524,621	527,461	530,310	533,170	536,040	538,920	541,813	544,715	547,631
558	550,557	553,495	556,447	559,410	562,386	565,374	568,374	571,388	574,414	577,456
559	580,510	583,577	586,659	589,753	592,863	595,984	599,119	602,269	605,431	608,610
560	611,801	615,007	618,231	621,467	624,722	627,991	631,280	634,591	637,920	641,272
561	644,644	648,038	651,457	654,896	658,360	661,847	665,356	668,890	672,444	676,022
562	679,620	683,239	686,883	690,547	694,234	697,942	701,671	705,424	709,197	712,996
563	716,816	720,659	724,528	728,420	732,338	736,277	740,239	744,225	748,232	752,264
564	756,315	760,388	764,484	768,599	772,736	776,892	781,069	785,269	789,488	793,730
565	797,990	802,272	806,578	810,905	815,256	819,626	824,018	828,434	832,870	837,330
566	841,810	846,313	850,840	855,387	859,959	864,551	869,165	873,808	878,475	883,174
567	887,897	892,646	897,424	902,225	907,055	911,907	916,785	921,690	926,618	931,574
568	936,552	941,555	946,587	951,640	956,722	961,826	966,956	972,113	977,291	982,498
569	987,726	992,978	998,259	1,003,559	1,008,886	1,014,233	1,019,602	1,024,997	1,030,412	1,035,852
570	1,041,313	1,046,796	1,052,306	1,057,836	1,063,394	1,068,972	1,074,575	1,080,205	1,085,857	1,091,536
571	1,097,235	1,102,959	1,108,710	1,114,483	1,120,284	1,126,104	1,131,948	1,137,818	1,143,708	1,149,624
572	1,155,559	1,161,516	1,167,499	1,173,500	1,179,527	1,185,573	1,191,641	1,197,736	1,203,851	1,209,991
573	1,216,150	1,222,331	1,228,538	1,234,763	1,241,014	1,247,283	1,253,574	1,259,892	1,266,228	1,272,590
574	1,278,972	1,285,377	1,291,809	1,298,261	1,304,741	1,311,243	1,317,769	1,324,323	1,330,899	1,337,504
575	1,344,132	1,350,785	1,357,470	1,364,177	1,370,915	1,377,677	1,384,467	1,391,288	1,398,131	1,405,005
576	1,411,900	1,418,822	1,425,775	1,432,751	1,439,758	1,446,787	1,453,844	1,460,930	1,468,040	1,475,182
577	1,482,346	1,489,535	1,496,754	1,503,993	1,511,261	1,518,549	1,525,863	1,533,208	1,540,575	1,547,972
578	1,555,390	1,562,835	1,570,309	1,577,803	1,585,327	1,592,871	1,600,440	1,608,040	1,615,661	1,623,315
579	1,630,993	1,638,699	1,646,439	1,654,206	1,662,006	1,669,832	1,677,688	1,685,578	1,693,492	1,701,439
580	1,709,411	1,717,412	1,725,446	1,733,504	1,741,595	1,749,710	1,757,854	1,766,030	1,774,230	1,782,461
581	1,790,716	1,798,997	1,807,312	1,815,648	1,824,017	1,832,409	1,840,828	1,849,279	1,857,752	1,866,259
582	1,874,788	1,883,347	1,891,940	1,900,556	1,909,207	1,917,883	1,926,588	1,935,327	1,944,092	1,952,892
583	1,961,715	1,970,570	1,979,460	1,988,373	1,997,321	2,006,293	2,015,293	2,024,328	2,033,386	2,042,477
584	2,051,590	2,060,731	2,069,906	2,079,102	2,088,333	2,097,588	2,106,872	2,116,191	2,125,534	2,134,912
585	2,144,315									

Appendix C

Eufaula Lake RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD

SEPTEMBER 2004 SURVEY
Power Pool Elevation 585.0 ft
ELEVATION INCREMENT IS ONE TENTH FOOT

		4554 1114	0050		Power Pool Elevation 585.0 ft ELEVATION INCREMENT IS ONE TENTH FOOT					
ELEVATION I		AREA IN A	CRES		ELEVA	ATION INCRE	MENT IS ONE	TENTH FOO	Т	
ELEVATION	0.0	0.4	0.0	0.2	0.4	0.5	0.0	0.7	0.0	0.0
in Feet 491	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
492	0	0	0	0	0	0	0	0		0
492	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
494	0	0	0	0	0	0	0	0	0	0
495	0	0	0	0	0	1	1	1	1	1
496	1	1	1	1	1	1	1	1	1	1
497	1	2	2	2	2	2	2	2	2	2
498	3	3	3	3	3	3	3	4	4	4
499	4	4	4	5	5	5	5	6	6	6
500	6	7	7	7	8	8	8	9	9	9
501	10	10	11	11	12	12	13	14	15	16
502	18	20	22	25	27	30	33	36	39	42
503	45	49	52	56	60	63	68	73	77	82
504	86	90	95	101	107	113	119	126	132	138
505	145	151	158	164	172	180	187	196	204	214
506	224	233	242	251	260	270	281	290	300	310
507	320	330	340	350	361	372	383	393	403	413
508	424	434	446	456	467	477	487	497	508	519
509	532	545	557	570	583	596	610	625	641	658
510	675	692	710	727	744	760	777	795	815	836
511	859	881	904	928	953	977	1,002	1,026	1,050	1,074
512	1,097	1,121	1,148	1,175	1,202	1,231	1,262	1,295	1,329	1,365
513	1,402	1,440	1,477	1,518	1,557	1,595	1,633	1,671	1,708	1,746
514	1,783	1,822	1,863	1,908	1,952	1,999	2,047	2,094	2,144	2,196
515	2,250	2,305	2,359	2,409	2,459	2,512	2,570	2,628	2,691	2,753
516	2,813	2,873	2,933	2,992	3,050	3,110	3,170	3,227	3,282	3,336
517	3,386	3,434	3,483	3,530	3,576	3,623	3,668	3,711	3,753	3,794
518	3,833	3,869	3,905	3,941	3,978	4,015	4,053	4,090	4,128	4,166
519	4,203	4,239	4,275	4,310	4,343	4,376	4,407	4,437	4,465	4,493
520	4,520	4,545	4,570	4,593	4,617	4,640	4,663	4,685	4,708	4,731
521	4,754	4,777	4,800	4,822	4,844	4,865	4,885	4,906	4,927	4,949
522	4,971	4,993	5,015	5,037	5,061	5,085	5,110	5,134	5,160	5,186
523	5,211	5,238	5,265	5,290	5,315	5,341	5,366	5,391	5,415	5,440
524	5,465	5,491	5,517	5,543	5,570	5,598	5,627	5,656	5,686	5,716
525	5,747	5,777	5,808	5,839	5,870	5,902	5,934	5,966	6,000	6,033
526	6,068	6,104	6,142	6,183	6,224	6,264	6,302	6,339	6,376	6,414
527	6,452	6,490	6,529	6,567	6,607	6,646	6,687	6,729	6,773	6,818
528	6,867	6,915	6,961	7,008	7,057	7,107	7,160	7,216	7,274	7,329
529	7,383	7,437	7,490	7,544	7,600	7,655	7,709	7,761	7,813	7,865
530	7,917	7,970	8,022	8,073	8,125	8,175	8,224	8,274	8,323	8,374
531	8,424	8,473	8,520	8,567	8,615	8,663	8,712	8,762	8,816	8,869
532	8,923	8,979	9,033	9,087	9,137	9,183	9,228	9,272	9,318	9,364
533	9,411	9,456	9,501	9,545	9,587	9,627	9,668	9,710	9,750	9,790
534	9,831	9,873	9,915	9,955	9,994	10,032	10,070	10,110	10,148	10,187
535	10,226	10,265	10,304	10,344	10,386	10,429	10,474	10,520	10,568	10,616
536	10,663	10,712	10,763	10,814	10,866	10,920	10,974	11,030	11,089	11,147
537	11,208	11,269	11,331	11,395	11,460	11,527	11,592	11,657	11,722	11,785
538	11,851	11,916	11,982	12,048	12,113	12,177	12,239	12,297	12,352	12,407
539	12,461	12,515	12,569	12,624	12,679	12,735	12,790	12,844	12,902	12,964
540	13,029	13,092	13,158	13,224	13,291	13,361	13,432	13,501	13,567	13,635
541	13,702	13,770	13,837	13,901	13,962	14,024	14,084	14,142	14,200	14,260
542	14,319	14,379	14,441	14,505	14,566	14,626	14,685	14,744	14,803	14,862
543	14,922	14,982	15,044	15,109	15,176	15,248	15,324	15,398	15,471	15,544
544	15,617	15,693	15,766	15,840	15,913	15,988	16,067	16,143	16,218	16,291
545	16,359	16,427	16,494	16,561	16,627	16,696	16,761	16,825	16,890	16,955
546	17,020	17,086	17,152	17,217	17,281	17,348	17,414	17,479	17,545	17,611
547	17,680	17,754	17,830	17,909	17,989	18,069	18,148	18,228	18,306	18,385
9 11	,000	,	,000	,000	,000	. 5,000	. 5, 1 10	. 5,225	. 5,555	. 5,555

Appendix C (continued)

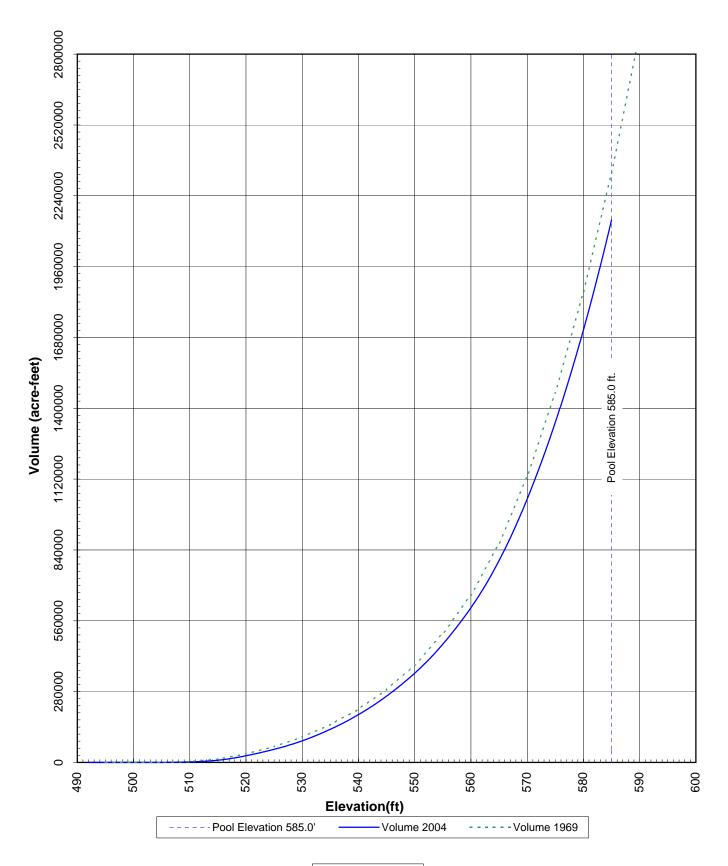
Eufaula Lake RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD

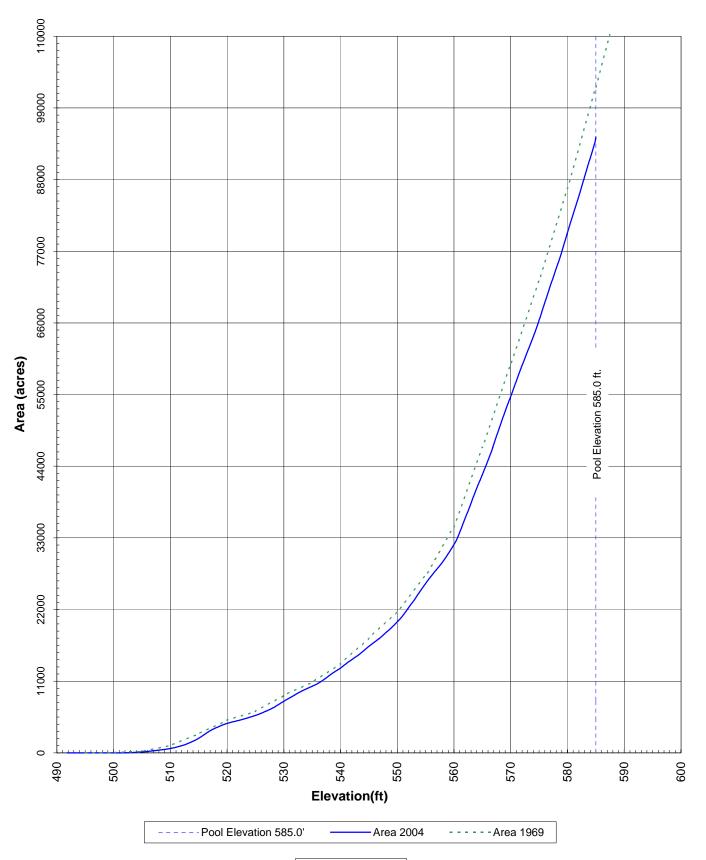
SEPTEMBER 2004 SURVEY

Power Pool Elevation 585.0 ft AREA IN ACRES **ELEVATION INCREMENT IS ONE TENTH FOOT** ELEVATION in Feet 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

In Feet	ELEVATION										
549 19,237 19,320 19,404 19,489 19,576 19,670 19,760 19,845 19,933 20,021 550 20,111 20,202 20,294 20,386 20,481 20,577 20,675 20,778 20,884 20,991 551 21,097 21,207 21,319 21,486 21,558 21,683 21,804 21,928 22,055 22,341 23,361 552 22,300 22,428 22,549 22,667 22,782 22,895 23,092 23,122 23,241 23,361 554 24,774 24,899 25,022 25,145 25,268 25,391 25,516 25,643 26,779 26,831 25,770 25,891 556 27,161 27,272 27,384 27,492 27,601 27,708 28,949 26,779 28,266 28,319 28,262 28,411 28,543 28,612 29,945 30,602 28,944 29,572 29,695 29,819 30,071 30,200 30	in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
550 20,111 20,202 20,294 20,386 20,481 20,577 20,675 20,778 20,884 20,991 551 21,097 21,207 21,319 21,436 21,558 21,683 21,804 21,928 22,055 22,178 552 22,300 22,428 22,549 22,667 22,782 22,895 23,009 23,122 23,241 23,361 553 23,484 23,608 26,322 25,145 25,268 25,391 25,516 26,643 25,770 25,891 555 26,008 26,127 26,248 26,366 26,485 26,603 26,719 26,833 26,944 27,052 556 27,161 27,727 27,384 28,642 28,753 30,071 30,003 30,746 30,822 29,849 29,572 29,695 29,819 29,45 30,071 30,200 30,336 30,474 560 31,994 32,146 32,298 32,453 32,615 32,795				18,610	18,684	18,759	•	18,916	18,995	19,075	19,156
551 21,097 21,207 21,319 21,436 21,558 21,683 21,804 21,928 22,065 22,178 552 22,300 22,428 22,549 22,667 22,782 22,885 23,009 23,122 23,241 23,361 553 23,484 23,608 23,732 23,864 24,001 24,133 24,261 24,391 24,519 24,646 554 24,774 24,889 25,022 25,268 25,391 25,616 25,643 25,770 25,891 556 27,161 27,272 27,384 27,492 27,601 27,708 27,814 27,919 28,025 28,131 557 28,236 28,349 29,572 29,695 29,819 29,945 30,000 30,744 30,000 30,363 30,474 559 30,699 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 31,844 561 33,837 34,662	549	19,237	19,320	19,404	19,489	19,576	19,670	19,760	19,845	19,933	20,021
552 22,300 22,428 22,549 22,667 22,782 22,895 23,009 23,122 23,241 23,361 553 23,484 23,608 23,732 23,864 24,001 24,133 24,261 24,391 24,519 24,646 554 24,774 24,899 25,022 25,145 25,268 25,516 25,516 25,643 25,770 28,891 555 26,008 26,127 26,248 26,366 26,485 26,603 26,719 26,833 26,944 27,052 556 27,161 27,272 27,384 27,492 27,601 27,708 27,814 27,919 28,025 28,039 28,441 28,644 28,673 28,862 28,974 29,089 29,077 558 29,326 29,449 29,572 29,685 29,1819 29,945 30,071 30,200 30,336 30,474 560 31,994 32,146 32,298 32,453 32,615 32,795 32,996 <th>550</th> <td>20,111</td> <td>20,202</td> <td>20,294</td> <td>20,386</td> <td>20,481</td> <td>20,577</td> <td>20,675</td> <td>20,778</td> <td>20,884</td> <td>20,991</td>	550	20,111	20,202	20,294	20,386	20,481	20,577	20,675	20,778	20,884	20,991
553 23,484 23,608 23,732 23,864 24,001 24,133 24,261 24,391 24,619 24,686 554 24,774 24,899 25,022 25,145 25,268 25,391 25,166 25,643 25,770 25,891 555 26,008 26,127 26,248 26,366 26,485 26,003 26,719 26,833 26,944 27,952 556 27,161 27,272 27,384 27,492 27,601 27,708 27,814 27,919 28,025 28,131 557 28,236 28,449 29,572 29,695 29,819 29,948 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 31,844 560 31,994 32,146 32,298 32,875 33,919 35,215 35,438 35,659 38,876 561 33,873 34,062 34,284	551	21,097	21,207	21,319	21,436	21,558	21,683	21,804	21,928	22,055	22,178
554 24,774 24,899 25,022 25,145 25,268 25,391 25,516 25,643 25,770 25,891 555 26,008 26,127 26,248 26,366 26,885 26,077 27,611 27,072 27,384 27,492 27,601 27,708 27,814 27,919 28,026 28,131 25,772 28,236 28,339 28,441 28,544 28,647 28,753 28,862 28,974 29,089 29,207 558 29,326 29,449 29,572 29,695 29,819 29,945 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 33,837 31,401 33,617 561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 38,076 562 36,094 36,312 36,535 36,755 36,973 37,190 37,417 37			22,428	22,549	22,667	22,782	22,895	23,009	23,122	23,241	23,361
555 26,008 26,127 26,248 26,366 26,485 26,603 26,719 26,833 26,944 27,052 556 27,161 27,272 27,384 27,492 27,601 27,708 27,814 27,919 28,025 28,131 557 28,236 28,339 28,441 28,644 28,673 28,662 28,974 29,099 29,207 558 29,326 29,449 29,572 29,695 29,819 29,945 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 33,401 33,616 32,795 32,996 33,202 33,601 36,555 36,755 36,753 37,190 35,7410 37,630 37,857 38,089 563 38,320 38,559 38,033 39,050 39,226 39,512 39,737 39,965 40,191 40,413 40,413 40,644 40,632 4	553	23,484	23,608	23,732	23,864	24,001	24,133	24,261	24,391	24,519	24,646
556 27,161 27,272 27,384 27,492 27,601 27,08 27,814 27,919 28,025 28,131 557 28,236 29,449 29,572 29,695 29,819 29,945 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 31,844 560 31,994 32,146 32,298 32,453 32,615 32,795 32,996 33,202 33,401 33,617 561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 38,809 563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,833 42,091 42,299 42,508 566 42,719 42,939 43,162		· '			25,145	25,268	25,391		25,643	25,770	
557 28,236 28,339 28,441 28,544 28,647 28,753 28,862 28,974 29,089 29,207 558 29,326 29,449 29,572 29,695 29,819 29,945 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 31,844 560 31,994 32,146 32,298 32,453 32,615 32,795 32,996 33,202 33,401 33,617 561 36,094 36,312 36,535 36,755 36,973 37,190 37,410 37,630 37,857 38,809 563 38,320 38,559 38,803 39,950 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,675 41,883 42,091 42,299 42,508 565 42,719 42,934			26,127	26,248	26,366	26,485	26,603	26,719	26,833	26,944	27,052
558 29,326 29,449 29,572 29,695 29,819 29,945 30,071 30,200 30,336 30,474 559 30,609 30,746 30,882 31,016 31,151 31,227 31,423 31,561 31,702 31,844 560 31,994 32,146 32,298 32,453 32,615 35,215 35,438 35,659 35,876 561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 38,803 562 36,094 36,312 36,535 36,755 36,973 37,190 37,410 37,630 37,857 38,089 563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,966 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,883 42,091 42,299 42,508 4565 42,719 42,939 43,162 43,3866	556	27,161	27,272	27,384	27,492	27,601	27,708	27,814	27,919	28,025	28,131
559 30,609 30,746 30,882 31,016 31,151 31,287 31,423 31,561 31,702 31,844 560 31,994 32,146 32,298 32,453 32,615 32,795 32,996 33,202 33,401 33,617 561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 38,095 562 36,094 36,312 36,535 36,755 36,973 37,190 37,410 37,630 37,857 38,089 563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,675 41,883 42,091 42,299 42,508 46,719 42,939 43,162 43,386 43,603 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154			28,339	28,441	28,544	28,647	28,753	28,862	28,974	29,089	
560 31,994 32,146 32,298 32,453 32,615 32,795 32,996 33,202 33,401 33,617 561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 35,876 562 36,094 36,312 36,535 36,755 36,973 37,410 37,630 37,857 38,089 563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,675 41,883 42,091 42,299 42,508 565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,705 566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 48,427 47,105 567 47,375 46,546 43,484	558	29,326	29,449	29,572	29,695	29,819	29,945	30,071	30,200	30,336	30,474
561 33,837 34,062 34,284 34,516 34,752 34,991 35,215 35,438 35,659 35,876 562 36,094 36,312 36,555 36,755 36,973 37,190 37,410 37,630 37,650 38,095 38,093 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,056 41,465 41,675 41,883 42,091 42,299 42,508 565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,91	559	30,609	30,746	30,882	31,016	31,151	31,287	31,423	31,561	31,702	31,844
562 36,094 36,312 36,535 36,755 36,973 37,190 37,410 37,630 37,857 38,089 563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,675 41,883 42,091 42,299 42,508 565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,27 51,184 51,432 51,674 51,915 52,171 569 52,416 52,684 55,199	560	31,994	32,146	32,298	32,453	32,615	32,795	32,996	33,202	33,401	33,617
563 38,320 38,559 38,803 39,050 39,286 39,512 39,737 39,965 40,191 40,413 564 40,632 40,845 41,051 41,256 41,465 41,675 41,883 42,091 42,299 42,508 565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 56,166 56,405 56,649 56,899 571 57,128 57,372			34,062	34,284	34,516	34,752	34,991	35,215	35,438	35,659	35,876
564 40,632 40,845 41,051 41,256 41,465 41,675 41,883 42,091 42,299 42,508 565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,849 571 57,228 57,622 57,867	562	36,094	36,312	36,535	36,755	36,973	37,190	37,410	37,630	37,857	38,089
565 42,719 42,939 43,162 43,386 43,605 43,821 44,036 44,256 44,477 44,700 566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693	563	38,320	38,559	38,803	39,050	39,286	39,512	39,737	39,965	40,191	40,413
566 44,925 45,145 45,370 45,595 45,815 46,039 46,282 46,546 46,825 47,105 567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157	564	40,632	40,845	41,051	41,256	41,465	41,675	41,883	42,091	42,299	42,508
567 47,375 47,630 47,899 48,154 48,404 48,661 48,912 49,161 49,414 49,669 568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180	565	42,719	42,939	43,162	43,386	43,605	43,821	44,036	44,256	44,477	
568 49,919 50,169 50,424 50,675 50,927 51,184 51,432 51,674 51,915 52,171 569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,376 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,688 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686	566	44,925	45,145	45,370	45,595	45,815	46,039	46,282	46,546	46,825	47,105
569 52,416 52,659 52,904 53,133 53,364 53,592 53,819 54,046 54,274 54,501 570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369	567	47,375	47,630	47,899	48,154	48,404	48,661	48,912	49,161	49,414	49,669
570 54,732 54,964 55,199 55,431 55,670 55,920 56,166 56,405 56,649 56,889 571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039	568	49,919	50,169	50,424	50,675	50,927	51,184	51,432	51,674	51,915	52,171
571 57,128 57,372 57,622 57,867 58,102 58,334 58,566 58,796 59,027 59,255 572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590			52,659	52,904	53,133	53,364	53,592	53,819	54,046	54,274	54,501
572 59,472 59,693 59,916 60,138 60,361 60,587 60,814 61,042 61,269 61,493 573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230	570	54,732	54,964	55,199	55,431	55,670	55,920	56,166	56,405	56,649	56,889
573 61,715 61,936 62,157 62,376 62,595 62,817 63,039 63,264 63,490 63,716 574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150	571	57,128	57,372	57,622	57,867	58,102	58,334	58,566	58,796	59,027	59,255
574 63,946 64,180 64,417 64,658 64,905 65,151 65,397 65,647 65,901 66,159 575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893			59,693	59,916	60,138	60,361	60,587	60,814	61,042	61,269	61,493
575 66,422 66,686 66,954 67,223 67,497 67,774 68,051 68,315 68,581 68,843 576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751	573	61,715	61,936	62,157	62,376	62,595	62,817	63,039	63,264	63,490	63,716
576 69,104 69,369 69,636 69,908 70,181 70,448 70,710 70,976 71,253 71,527 577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715	574	63,946	64,180	64,417	64,658	64,905	65,151	65,397	65,647	65,901	66,159
577 71,787 72,039 72,285 72,527 72,775 73,031 73,291 73,551 73,814 74,076 578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570					67,223	67,497			68,315	68,581	
578 74,333 74,590 74,840 75,087 75,332 75,581 75,838 76,101 76,373 76,650 579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899	576	69,104	69,369	69,636	69,908	70,181	70,448	70,710	70,976	71,253	71,527
579 76,935 77,230 77,529 77,828 78,132 78,427 78,721 79,015 79,305 79,593 580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899			72,039		72,527	72,775	73,031	73,291	73,551	73,814	74,076
580 79,882 80,167 80,455 80,741 81,029 81,312 81,596 81,875 82,150 82,423 581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899			74,590	74,840	75,087	75,332	75,581	75,838	76,101	76,373	76,650
581 82,700 82,976 83,249 83,522 83,799 84,073 84,346 84,618 84,893 85,173 582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899				77,529	77,828	78,132			79,015	79,305	79,593
582 85,460 85,751 86,041 86,333 86,629 86,922 87,217 87,516 87,815 88,111 583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899	580	79,882	80,167	80,455	80,741	81,029	81,312	81,596	81,875	82,150	82,423
583 88,413 88,715 89,012 89,303 89,592 89,882 90,170 90,459 90,740 91,018 584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899			82,976	83,249	83,522	83,799	84,073	84,346	84,618	84,893	85,173
584 91,294 91,570 91,849 92,132 92,421 92,714 93,010 93,305 93,601 93,899	582	85,460	85,751	86,041	86,333	86,629	86,922	87,217	87,516	87,815	88,111
		· ·		89,012	89,303	89,592	89,882	90,170	90,459	90,740	
585 94,526			91,570	91,849	92,132	92,421	92,714	93,010	93,305	93,601	93,899
	585	94,526									



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