Volumetric Survey of Lake Whitney

June 2005 Survey

Prepared by:

The Texas Water Development Board

September 2006

Texas Water Development Board

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Brazos River Authority

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U.S Army Corps of Engineers, Fort Worth District

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Executive Summary

In May of 2005, the Texas Water Development Board (TWDB) entered into agreement with the Brazos River Authority, for the purpose of performing a volumetric survey of Lake Whitney while the reservoir was near the top of the conservation pool elevation. This information was converted into updated Elevation-Volume and Elevation-Area Tables. Additionally, the results of the 2005 survey were compared to a previous resurvey of Lake Whitney conducted by the U.S. Army Corps of Engineers (USACE) in 1959. Cross-sections from the 2005 survey are compared to similar cross-sections from the 1959 USACE resurvey and to the original cross-sections of 1951, as plotted in the 1959 report.

The results of the TWDB 2005 Survey indicate Lake Whitney has a capacity of 554,203 acre-feet and encompasses 23,220 acres at the conservation pool elevation of 533.0 feet above mean sea level. The Report of Sedimentation, Resurvey, Whitney Reservoir, in 1959 by the USACE indicated Lake Whitney had a volume of 627,100 acre-feet and encompassed 23,560 acres at conservation pool elevation. It appears that between 2005 and 1959, Lake Whitney lost 72,897 acre-feet or 11.6% of its capacity and experienced a 1.4 % decrease in area.

Forty-three sediment range lines were established in 1951 by the USACE and thirty-two were resurveyed in 1959. The original range line end points are unavailable, therefore, TWDB staff re-established sediment range lines in the vicinity of the original range lines. Nine cross-sections presented in the 1959 report, including both the 1951 and the 1959 cross-sections, are presented for comparison with the 2005 cross-sections in Appendix G.

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Lake Whitney General Information

Lake Whitney is located in Bosque and Hill Counties on the main stem of the Brazos River in Central Texas. The primary purpose of Lake Whitney is flood control. Secondarily the lake supports the production of hydroelectric power and recreation. Lake Whitney is a part of the Mid-Brazos Project in the Fort Worth District of the U.S. Army Corps of Engineers.[1]

Lake Whitney was originally authorized by Congress under the Flood Control Act of August 18, 1941 (Public Law 228, 77th Congress, 1st Session)[2]. However, when the U.S. became involved in World War II all funding was diverted to the war effort. Construction was reauthorized by the Flood Control Act of December 22, 1944 (Public Law 534, 78th Congress, 2nd Session).[2,3] Construction of Whitney Dam began on May 12, 1947, and deliberate impoundment began on December 10, 1951. Construction of the powerhouse began in April 1951 and power generation began on June 25, 1953.[2,3] Whitney Dam powerhouse uses two 13,000 volt generators that produce 15,000 kilowatts per hour and have a turbine capacity of 20,700 horsepower, each. Average annual power production is 73,100,000 kilowatt-hours.[4]

Lake Whitney is owned by the U.S Government and operated by the U.S Army Corps of Engineers. The water rights to Lake Whitney are appropriated to the Brazos River Authority (BRA) by Certificate of Adjudication 12-5157, with a priority date of August 30, 1982. The BRA is authorized to impound 50,000 acre-feet of water, between elevations 520 feet and 533 feet above mean sea level, in Lake Whitney. The certificate authorizes a priority right to divert and use not to exceed 18,336 acre-feet of water per annum from the reservoir for municipal and industrial purposes. The amount of this priority right may be used in computing the sum of priority rights for the purpose of system operation as authorized by Commission Order of July 23, 1964. For purposes of system operation the BRA is authorized to exceed the priority right and annually divert and use from Lake Whitney not to exceed 25,000 acre-feet of water per annum for municipal purposes and 25,000 acre-feet of water for industrial purposes. All diversions and use of water exceeding 18,336 acre-feet in any calendar year shall be charged against the sum of the amounts designated as priority rights in other reservoirs included in the

System Operation Order. The owner is also authorized to use the water impounded for non-consumptive recreational uses. Section 5-O renders this certificate junior in priority rights to any rights which may be granted by the Texas Water Commission to the City of Stephenville pursuant to Application No. 4237.

Additionally, the BRA has subordinated their Lake Whitney rights to Somervell County Water District's Permit 5744. The complete certificates and permits are on file in the Records Division of the Texas Commission on Environmental Quality (TCEQ).

More information about Whitney Dam and Lake Whitney are presented below in Table 1. A map showing the location of Lake Whitney is presented in Figure 1.

Table 1. Pertinent Data for Whitney Dam and Lake Whitney[5,6]

Owner of Lake Whitney and Facilities	
The U.S. Government, Operated by the U.S. Army Corps of Engineers, Fort Worth District.	
Engineer (Design)	
U.S Army Corps of Engineers	
Location of Dam	
River Mile 442.4 on the Brazos River in Hill and Bosque Counties, 38 miles upstream from Waco, and 7.4 miles southwest of the City of Whitney.	
Drainage Area	
Approximately 27,189 square miles, of which 9,566 square miles is probably noncontributing.	
Dam	
Type	Concrete gravity and earthfill
Length	17,695 ft
Maximum Height	159 ft
Top Width	Embankment 34 ft and spillway 28 ft
Spillway	
Type	Ogee
Length (net at crest)	680.0 ft
Crest elevation	533.0 ft above msl
Control	17 tainter gates, each 40 by 38 ft
Outlet Works	
Type	16 conduits, each 5 by 9 ft
Control	Gates operated from tunnel
Invert elevation	448.83 ft above msl
Power Generation Features	
Number of units	2
Total capacity	30,000 kw

Table 1. Pertinent Data for Whitney Dam and Lake Whitney (Continued)

Reservoir Data (Based on TWDB 2005 Volumetric Survey)

Feature	Elevation (ft above msl)	Capacity (Acre-feet)	Area (Acres)
Top of Concrete Dam	584.0	N/A	N/A
Top of earth embankment	580.0	N/A	N/A
Maximum design water surface	573.0	N/A	N/A
Top of flood-control pool	571.0	N/A	N/A
Spillway Crest (top of ultimate Power pool)	533.0	554,203	23,220
Top of interim power pool	523.0	365,457	15,614
Invert of lowest intake*	448.83	854	165
Streambed**	425.0	0	0
Sediment reserve and power-head Storage space	520.0	320,711	14,301

*Capacity and area values given for elevation 448.8 ft above msl
**Lowest elevation surveyed during TWDB 2005 Survey: 432.71 ft above msl

Volumetric Survey of Lake Whitney

Introduction

In May of 2005, the Texas Water Development Board entered into agreement with the Brazos River Authority, for the purpose of performing a volumetric survey of Lake Whitney while the reservoir was at or near the top of the conservation pool elevation. This information was converted into updated Elevation-Volume and Elevation-Area Tables. Additionally, the results of the 2005 survey are compared to a prior survey of Lake Whitney conducted by the U.S. Army Corps of Engineers in 1959. Cross-sections of the 2005 survey are compared to cross-sections from the 1959 USACE report and to 1951 cross sections presented in the same report.

Bathymetric Survey

Bathymetric data collection for Lake Whitney occurred between June 20th and June 30th of 2005, while the water surface elevation was above the conservation pool elevation of 533.0 ft above mean sea level (msl). The water surface elevation varied between 533.30 ft and 533.81 ft above msl during the TWDB survey. The survey team used two boats equipped with depth sounders, velocity profilers, and integrated Differential Global Positioning System (DGPS) equipment to navigate along pre-planned range lines spaced approximately 500 feet apart in a perpendicular fashion to the original

stream channel. During the 2005 survey, the team navigated over 533 miles of range lines and collected over 270,000 data points. Figure 2 shows the data points collected during the TWDB 2005 survey.

The depth sounders were calibrated each day using the velocity profilers to measure the speed of sound in the water column and a weighted tape or stadia rod to verify the depth reading. The average speed of sound through the water column varied between 4,934.6 and 4,960.2 feet per second during the 2005 survey.

Datum

The vertical datum used during this survey is that used by the United States Geological Survey (USGS) for the reservoir elevation gauge USGS 08092500 Whitney Lk nr Whitney, TX.[7] The datum for this gauge is reported as National Geodetic Vertical Datum 1929 (NGVD29) or mean sea level (msl), thus elevations reported here are in feet (ft) above msl. Volume and area calculations in this report are referenced to water levels provided by the USGS gauge. The horizontal datum used for this report is NAD83 State Plane Texas Central Zone.

Survey Results

The results of the TWDB 2005 Survey indicate Lake Whitney has a volume of 554,203 acre-feet and encompasses 23,220 acres at conservation pool elevation. The results of the TWDB survey are compared to the USACE 1959 Resurvey of Lake Whitney in Table 2.

Feature	USACE Resurvey	TWDB Volumetric Survey
Year	1959	2005
Area (Acres)	23,560	23,220
Volume (Acre-feet)	627,100	554,203

Between the 2005 TWDB Survey and 1959, Lake Whitney appears to have lost 72,897 acre-feet or 11.6 % of its volume and experienced a 1.4 % decrease in area. The

USACE 1959 Resurvey consisted of resurveying 32 of the original 43 range lines that were established in 1951.[2] The original 1951 capacities for Lake Whitney are unavailable, although the 1959 report includes several tables of original volumes between many of the range lines. The Corps original calculations consisted of planimetering the area within each 10-foot contour on maps prepared by the BRA in 1937 and 1938 and deriving the volumes from the area curve at each foot using the average end-area method. The ranges that were resurveyed in 1959 were spotted on the 10-foot contour map and the segmental areas were planimetered at 10-foot intervals and capacities were calculated between the ranges.[2] Due to the methodological differences in computing the area and volume, direct comparisons of the TWDB 2005 survey with prior surveys of Lake Whitney are not recommended and are presented here for informational purposes only.[8] The TWDB considers the 2005 survey to be a significant improvement over previous methods and recommends that Lake Whitney be resurveyed in 5 to 10 years. The Brazos River Authority might also want to consider using a multi-frequency depth sounder which would allow more accurate identification of sediment depth, location, and volume.

Data Processing

Model Boundary

The reservoir boundary was digitized from aerial photographs using Environmental Systems Research Institute's (ESRI) ArcGIS 9.1 software. The aerial photographs, or digital orthophoto quadrangle images (DOQs), used for Lake Whitney were Laguna Park, Smiths Bend, Allen Bend, Whitney, Lakeside Village, Blum, Brazos Point, Morgan, and Blanton. These images were photographed between August 4th and September 8th of 2004. At the time the photographs were taken, the water surface elevation measured between 533.32 ft and 532.72 ft above mean sea level. Although only two of the photographs were above conservation pool elevation, at the recommended mapping scale of 1:12,000 for the DOQs, the difference in the land water interface between photos of varying water surface elevations is indiscernible. Therefore,

for modeling purposes, the boundary was digitized at the land water interface from the photos, and assigned the conservation pool elevation of 533.0 ft.

The United States Department of Agriculture, Farm Service Agency's, Aerial Photography Field Office (APFO), National Agriculture Imagery Program (NAIP) acquires the photographic imagery during the agricultural growing seasons in the continental U.S.[9] The imagery resides in the public domain and can be downloaded from the Texas Natural Resources Information System (TNRIS) website at http://www.tnris.state.tx.us/. For more information visit the APFO website at http://www.apfo.usda.gov/NAIP.html or contact TNRIS.

Triangular Irregular Network (TIN) Model

Upon completion of data collection, the raw data files are edited in HYPACK MAX to remove any data anomalies. The water surface elevations for each respective day are applied and the depths are converted to corresponding elevations and exported as a MASS points file. The MASS points and boundary files are used to create a Triangulated Irregular Network (TIN) model, a function of the 3D Analyst Extension of ArcGIS. The model uses Delauney's criteria for triangulation to place a triangle between three non-uniformly spaced points, including the boundary.[10]

Using Arc/Info software, volumes and areas are calculated from the TIN Model for the entire lake at one-tenth of a foot intervals, from elevation 432.7 ft to elevation 533.0 ft. The Elevation-Volume and Elevation-Area Tables, updated for 2005, are presented in Appendices A and B, respectively. An Elevation-Volume graph and an Elevation- Area graph are presented in Appendices C and D, respectively. Appendix E compares the Elevation-Volume Tables of 2005 to 1959, and Appendix F is a graphical representation comparing the 2005 volumes to 1959.

The TIN Model was interpolated and averaged using a cellsize of 10 ft and converted to a raster. The raster was used to produce Figure 3, an Elevation Relief Map representing the topography of the lake bottom, Figure 4, a map showing shaded depth ranges for Lake Whitney, and Figure 5, a 5-ft contour map.

Sediment Range Lines

Sedimentation Ranges were established by the USACE between April and December of 1951, and the first resurvey was conducted by the USACE from April to May of 1959.[2] The ranges were established to calculate the area, volume, and sedimentation rate of Lake Whitney. Nine of the cross-sections plotted in the 1959 report, including plots from 1951, were scanned and digitized for comparison with the 2005 cross-sections.

The original data and endpoint coordinates for each line are unavailable; therefore, the survey team estimated the range line endpoints by geo-referencing a paper copy of a 1963 USACE revised map showing original range line locations. The range lines were digitized from the map and the endpoint coordinates were projected to NAD83 from NAD27, the projection of the USACE map. Distortion is introduced during this process due to the aging and photocopying of the original map. However, horizontal distortion between the 2005 cross-sections and the historical cross-sections are predominately a result of map scale; for example, on the rectified USACE paper map, with a scale of 1:72,000, each range line may represent as much as 200 feet in width across the reservoir, while the 2005 map that the cross-sections were extracted from, has a 1:12,000 map scale, equal to the DOQs the reservoir boundary was digitized from. Horizontal distortion was corrected by aligning prominent features in the 2005 profiles to match those in the historical profiles. Other factors contributing to the variations in the cross-sections may include survey intensity, interpolations of the TIN Model from which the 2005 cross-sections were extracted, and/or sediment accumulation in the reservoir.

Generally, the cross-sectional comparisons indicate significant sedimentation at and upstream of SR09. Downstream of SR09, significant sediment accumulation appears to be confined to the historical stream channels. A resurvey using a multi-frequency depth sounder would aid in locating and quantifying the sediment volume within the reservoir.

The plotted cross-sectional comparisons are presented in Appendix G. Also in Appendix G is a map showing the location of the range lines and Table 3, a list of the endpoint coordinates for each range line re-established in 2005 by the TWDB.

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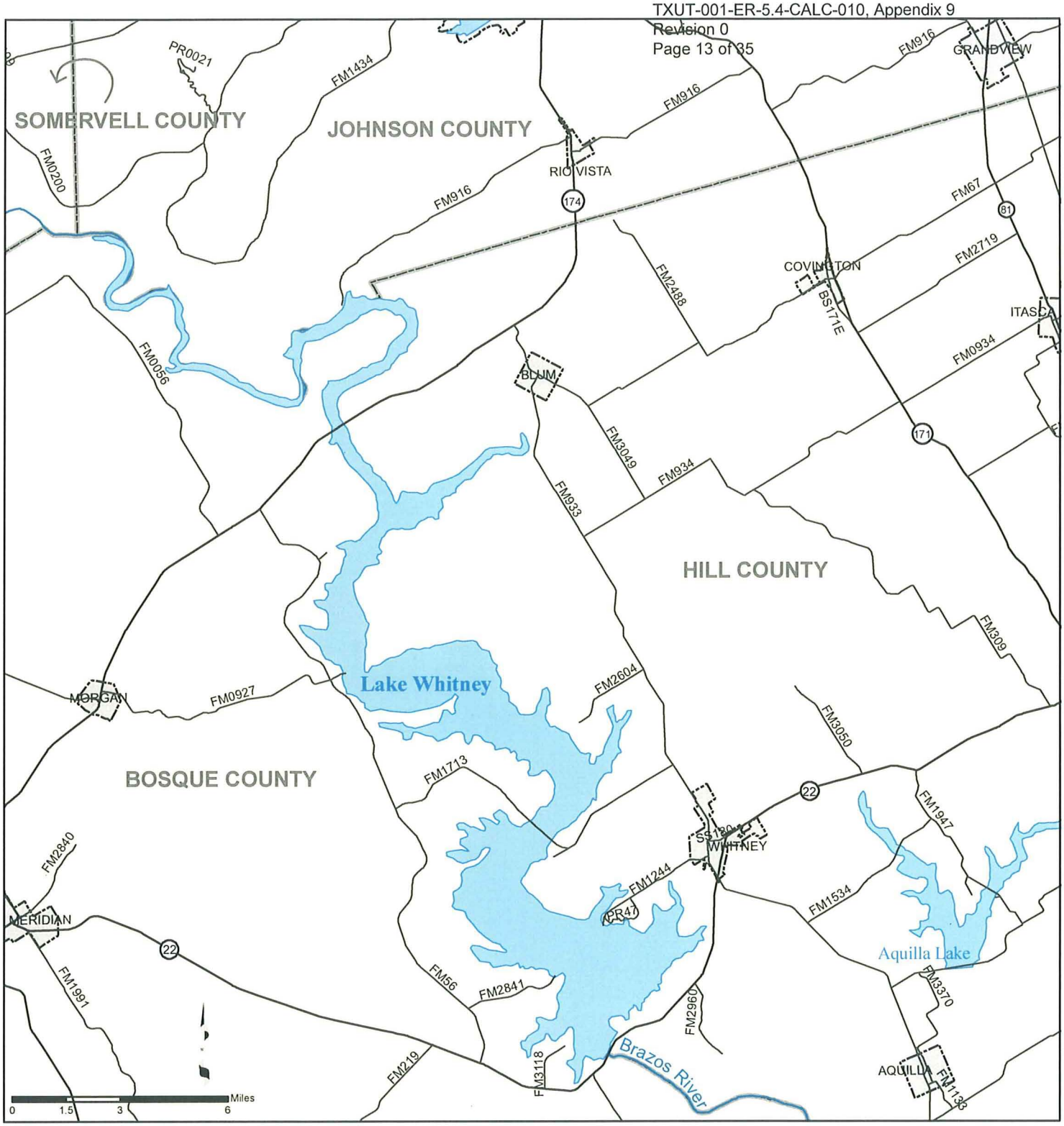


Figure 1

Whitney Lake

Location Map

Figure 2

Whitney Lake

Data Points collected during
2005 TWDB Survey

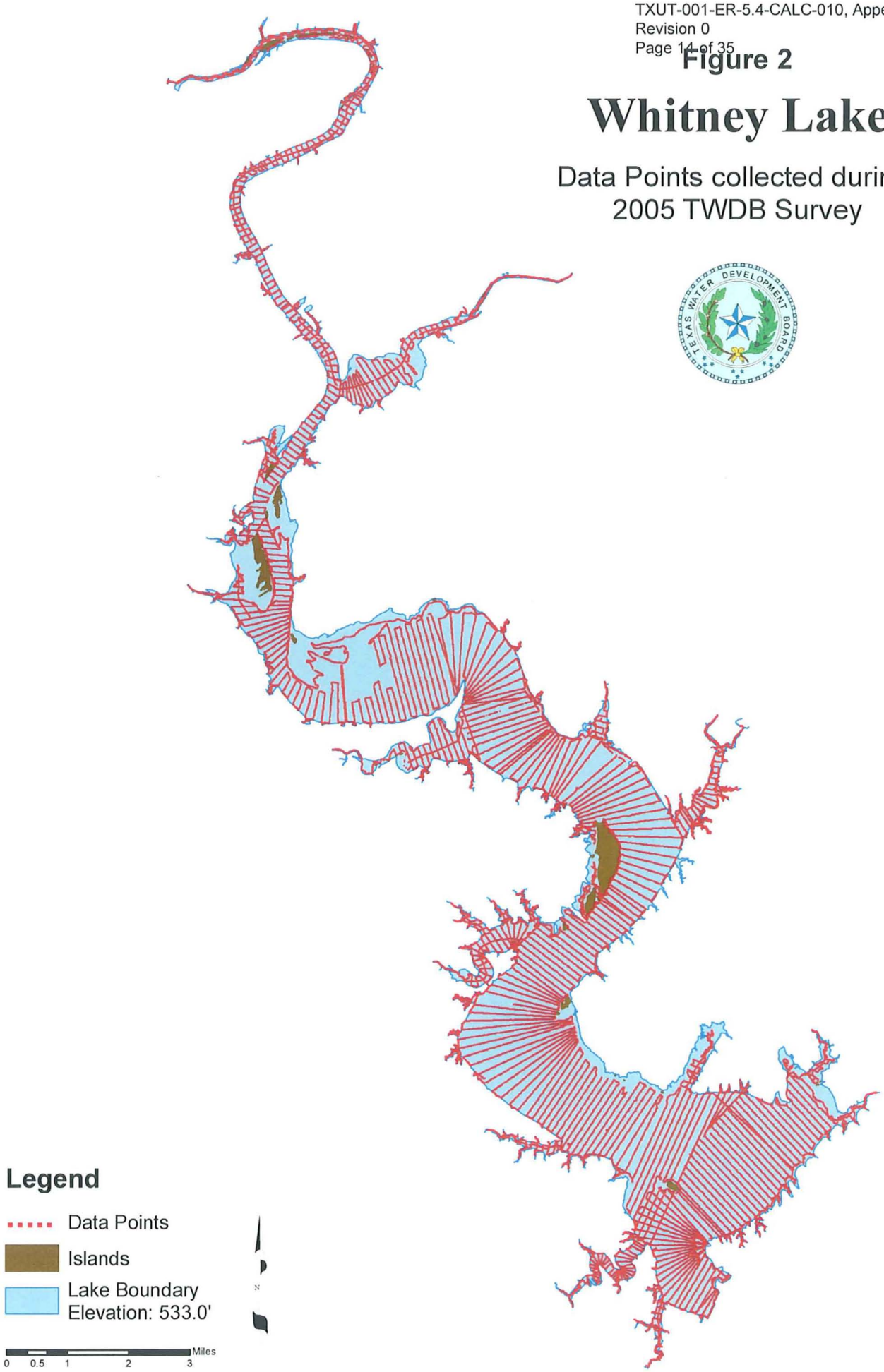


Figure 3

Whitney Lake

Elevation Relief Map

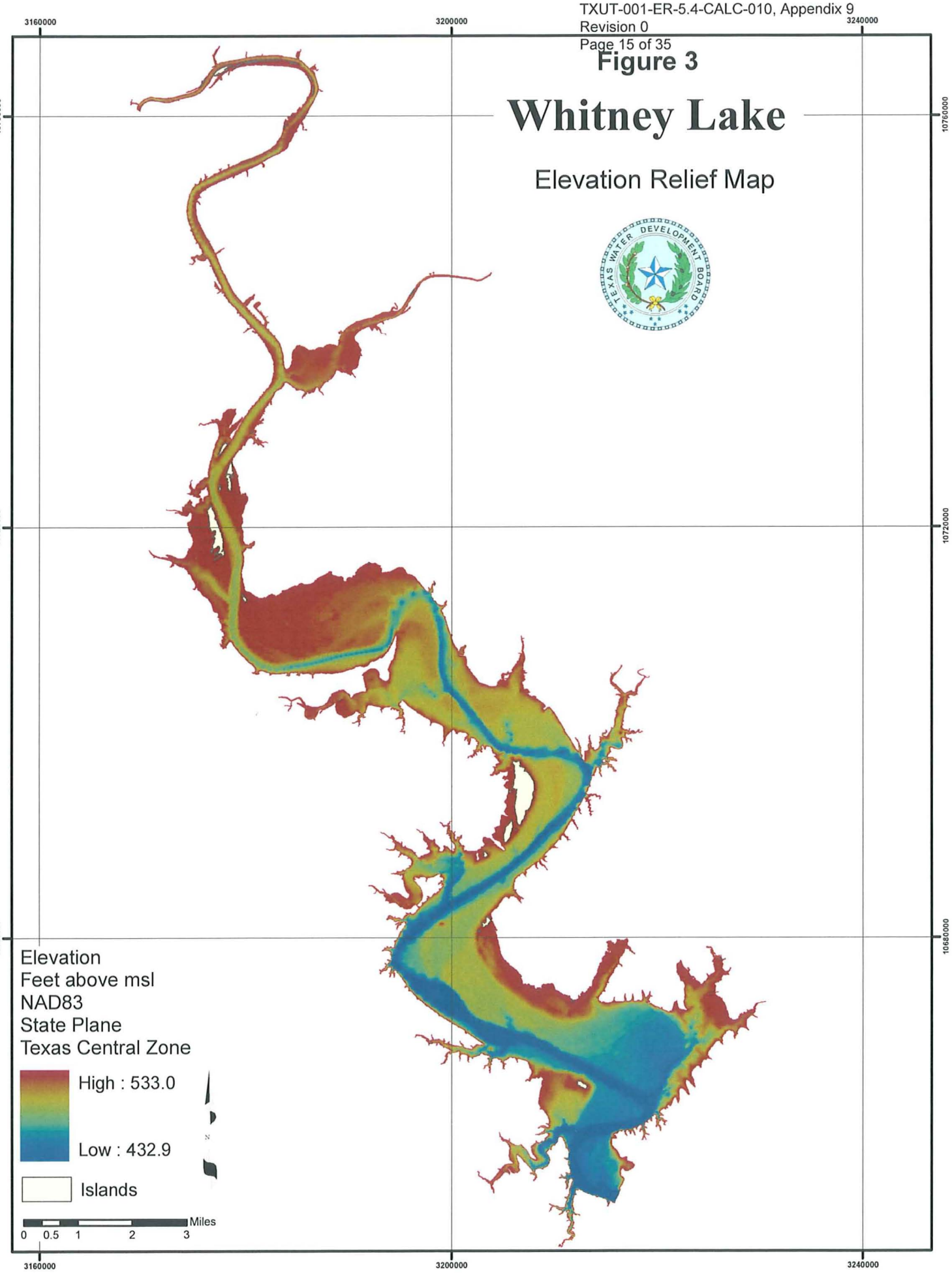
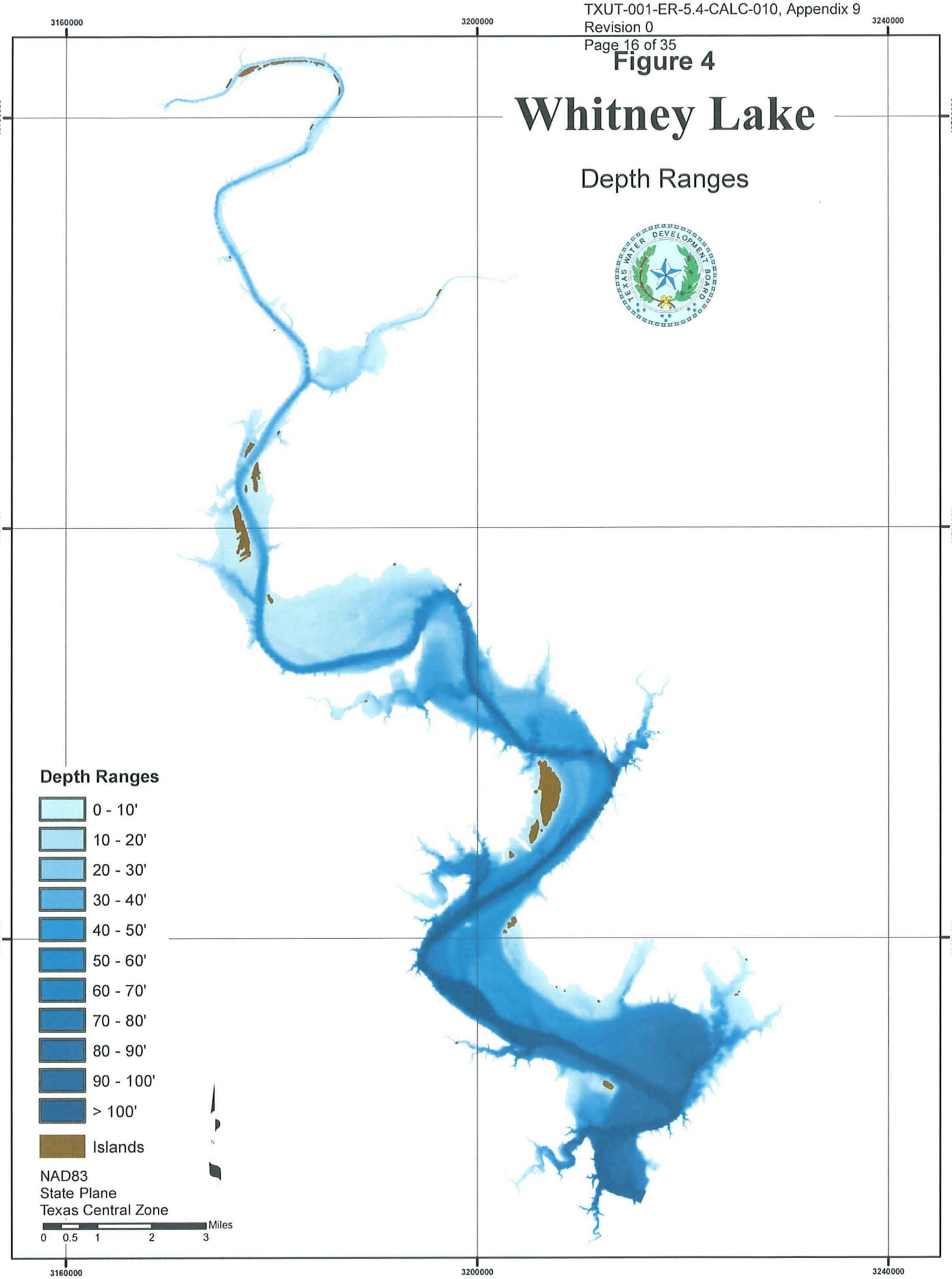


Figure 4

Whitney Lake

Depth Ranges



Appendix A

Whitney Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 2005 SURVEY

Conservation Pool Elevation 533.0'

VOLUME IN ACRE-FEET — 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	0.8	0.9
432								0	0	0
433	0	0	0	0	0	0	0	0	0	0
434	0	0	0	1	1	1	1	1	1	2
435	2	2	2	3	3	3	4	4	4	5
436	5	6	7	7	8	9	10	11	12	13
437	15	16	17	19	21	22	24	26	27	29
438	31	33	35	38	40	42	45	47	49	52
439	55	57	60	63	66	69	72	75	78	81
440	84	87	91	94	98	101	105	109	113	117
441	121	125	129	134	138	143	148	153	158	163
442	168	174	179	185	191	197	203	209	215	222
443	228	235	242	249	255	263	270	277	284	292
444	300	307	315	323	331	339	348	356	364	373
445	382	391	400	409	418	427	437	447	456	466
446	477	487	498	509	520	532	543	555	567	579
447	592	605	617	631	644	657	671	685	699	714
448	728	743	758	774	789	805	821	837	854	870
449	887	904	921	939	956	974	992	1,010	1,029	1,047
450	1,066	1,085	1,104	1,124	1,143	1,163	1,183	1,203	1,223	1,244
451	1,265	1,286	1,307	1,329	1,351	1,373	1,396	1,418	1,441	1,465
452	1,488	1,512	1,536	1,560	1,585	1,610	1,635	1,661	1,686	1,712
453	1,739	1,765	1,792	1,819	1,846	1,874	1,902	1,930	1,959	1,987
454	2,017	2,046	2,075	2,105	2,135	2,166	2,197	2,228	2,259	2,291
455	2,323	2,355	2,387	2,420	2,453	2,487	2,520	2,554	2,589	2,624
456	2,659	2,694	2,730	2,765	2,802	2,838	2,875	2,913	2,950	2,989
457	3,027	3,066	3,105	3,144	3,184	3,224	3,265	3,306	3,348	3,389
458	3,432	3,474	3,517	3,561	3,605	3,649	3,694	3,739	3,785	3,831
459	3,877	3,924	3,971	4,019	4,068	4,116	4,166	4,215	4,266	4,316
460	4,368	4,419	4,472	4,524	4,578	4,632	4,686	4,741	4,796	4,852
461	4,909	4,966	5,024	5,082	5,141	5,201	5,261	5,322	5,383	5,445
462	5,507	5,570	5,634	5,698	5,763	5,829	5,895	5,962	6,030	6,098
463	6,167	6,236	6,306	6,377	6,448	6,520	6,593	6,666	6,740	6,814
464	6,889	6,965	7,042	7,119	7,196	7,275	7,354	7,434	7,514	7,595
465	7,677	7,760	7,843	7,927	8,012	8,097	8,184	8,271	8,359	8,448
466	8,537	8,628	8,719	8,811	8,903	8,997	9,091	9,187	9,283	9,380
467	9,478	9,576	9,676	9,776	9,878	9,980	10,083	10,187	10,292	10,398
468	10,505	10,613	10,721	10,831	10,942	11,054	11,167	11,281	11,396	11,513
469	11,630	11,748	11,867	11,987	12,109	12,231	12,354	12,478	12,602	12,728
470	12,855	12,983	13,112	13,241	13,371	13,503	13,635	13,768	13,902	14,036
471	14,172	14,308	14,445	14,583	14,722	14,861	15,002	15,143	15,285	15,427
472	15,571	15,715	15,860	16,006	16,153	16,300	16,449	16,598	16,748	16,898
473	17,050	17,202	17,355	17,509	17,663	17,819	17,975	18,132	18,290	18,449
474	18,608	18,769	18,930	19,092	19,255	19,419	19,583	19,749	19,915	20,082
475	20,250	20,419	20,589	20,760	20,931	21,104	21,277	21,451	21,626	21,802
476	21,978	22,156	22,335	22,514	22,695	22,876	23,058	23,242	23,427	23,612
477	23,799	23,987	24,176	24,366	24,558	24,750	24,944	25,139	25,335	25,533
478	25,731	25,931	26,133	26,335	26,539	26,744	26,950	27,157	27,366	27,576
479	27,787	27,999	28,213	28,428	28,644	28,861	29,080	29,300	29,521	29,744
480	29,969	30,194	30,421	30,650	30,880	31,111	31,344	31,578	31,813	32,050
481	32,289	32,529	32,770	33,013	33,258	33,505	33,753	34,003	34,255	34,510
482	34,766	35,025	35,286	35,549	35,815	36,082	36,352	36,625	36,900	37,177
483	37,456	37,737	38,021	38,307	38,595	38,886	39,178	39,474	39,772	40,072
484	40,376	40,682	40,991	41,304	41,620	41,938	42,259	42,582	42,908	43,237
485	43,568	43,902	44,238	44,576	44,918	45,261	45,608	45,957	46,308	46,662
486	47,018	47,376	47,737	48,099	48,465	48,832	49,203	49,575	49,950	50,327
487	50,706	51,087	51,471	51,857	52,245	52,635	53,028	53,423	53,820	54,220
488	54,621	55,024	55,430	55,837	56,247	56,660	57,074	57,491	57,910	58,331
489	58,754	59,179	59,606	60,035	60,466	60,899	61,334	61,771	62,210	62,652
490	63,095	63,541	63,990	64,440	64,892	65,347	65,803	66,262	66,722	67,184
491	67,648	68,114	68,582	69,052	69,524	69,998	70,474	70,952	71,431	71,913

Appendix A (continued)

Whitney Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 2005 SURVEY

Conservation Pool Elevation 533.0'

VOLUME IN ACRE-FEET — 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	0.8	0.9
492	72,397	72,883	73,370	73,859	74,351	74,844	75,339	75,836	76,335	76,836
493	77,339	77,845	78,352	78,861	79,372	79,886	80,401	80,920	81,440	81,963
494	82,489	83,017	83,547	84,079	84,614	85,150	85,689	86,229	86,772	87,316
495	87,863	88,411	88,962	89,514	90,068	90,625	91,183	91,743	92,305	92,868
496	93,434	94,002	94,572	95,144	95,718	96,294	96,872	97,451	98,033	98,617
497	99,203	99,791	100,381	100,974	101,569	102,166	102,765	103,366	103,970	104,575
498	105,182	105,791	106,402	107,015	107,629	108,246	108,865	109,486	110,108	110,733
499	111,359	111,988	112,618	113,250	113,883	114,519	115,157	115,796	116,437	117,080
500	117,725	118,372	119,020	119,671	120,323	120,977	121,633	122,291	122,951	123,612
501	124,276	124,941	125,608	126,277	126,948	127,620	128,294	128,971	129,649	130,329
502	131,011	131,695	132,381	133,068	133,758	134,450	135,145	135,843	136,542	137,244
503	137,948	138,655	139,363	140,074	140,787	141,503	142,221	142,942	143,665	144,392
504	145,123	145,857	146,595	147,337	148,082	148,831	149,584	150,341	151,101	151,865
505	152,633	153,404	154,179	154,958	155,742	156,530	157,323	158,120	158,922	159,728
506	160,539	161,355	162,175	163,000	163,831	164,667	165,509	166,356	167,208	168,065
507	168,927	169,795	170,668	171,547	172,430	173,319	174,212	175,110	176,012	176,919
508	177,830	178,746	179,666	180,591	181,521	182,456	183,396	184,341	185,290	186,245
509	187,205	188,171	189,142	190,119	191,103	192,092	193,086	194,086	195,090	196,098
510	197,112	198,130	199,153	200,181	201,213	202,251	203,294	204,342	205,394	206,452
511	207,515	208,582	209,653	210,729	211,809	212,894	213,983	215,077	216,175	217,277
512	218,385	219,497	220,615	221,737	222,864	223,996	225,132	226,274	227,419	228,571
513	229,725	230,884	232,048	233,215	234,388	235,563	236,743	237,927	239,115	240,307
514	241,503	242,704	243,909	245,117	246,331	247,549	248,771	249,998	251,229	252,466
515	253,707	254,953	256,204	257,459	258,719	259,982	261,249	262,521	263,796	265,075
516	266,358	267,644	268,935	270,229	271,527	272,829	274,134	275,443	276,756	278,072
517	279,392	280,716	282,044	283,376	284,713	286,052	287,395	288,742	290,092	291,447
518	292,804	294,165	295,531	296,899	298,271	299,646	301,025	302,409	303,796	305,187
519	306,581	307,978	309,380	310,784	312,192	313,603	315,018	316,436	317,858	319,283
520	320,711	322,142	323,578	325,017	326,460	327,906	329,356	330,811	332,268	333,731
521	335,196	336,665	338,139	339,616	341,099	342,586	344,077	345,574	347,074	348,581
522	350,091	351,606	353,126	354,650	356,180	357,713	359,251	360,795	362,344	363,898
523	365,457	367,020	368,590	370,163	371,743	373,327	374,916	376,512	378,112	379,718
524	381,329	382,945	384,568	386,196	387,831	389,472	391,119	392,773	394,432	396,097
525	397,768	399,444	401,126	402,813	404,507	406,204	407,908	409,618	411,332	413,053
526	414,778	416,509	418,247	419,990	421,740	423,496	425,258	427,029	428,805	430,589
527	432,378	434,173	435,976	437,784	439,599	441,420	443,246	445,081	446,920	448,768
528	450,621	452,480	454,348	456,221	458,103	459,991	461,887	463,791	465,702	467,623
529	469,550	471,486	473,431	475,385	477,348	479,320	481,302	483,295	485,297	487,311
530	489,334	491,369	493,415	495,471	497,539	499,617	501,704	503,802	505,908	508,025
531	510,148	512,280	514,420	516,567	518,723	520,884	523,053	525,231	527,414	529,606
532	531,805	534,011	536,225	538,446	540,675	542,911	545,153	547,405	549,663	551,930
533	554,203									

Appendix B

Whitney Lake

RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD

JUNE 2005 SURVEY

Conservation Pool Elevation 533.0'

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	0.8	0.9
432								0	0	0
433	0	0	0	0	0	0	0	0	0	1
434	1	1	1	1	1	1	2	2	2	2
435	2	3	3	3	3	4	4	4	5	5
436	6	6	7	8	8	9	10	11	12	12
437	13	14	15	15	16	17	17	18	19	19
438	20	21	21	22	23	23	24	25	25	26
439	26	27	28	28	29	30	30	31	31	32
440	33	33	34	35	36	36	37	38	39	40
441	42	43	44	45	46	47	49	50	51	53
442	54	55	56	58	59	60	61	62	63	65
443	66	67	68	69	70	71	72	73	75	76
444	77	78	79	80	81	82	83	85	86	87
445	88	89	91	92	93	94	96	97	99	102
446	104	106	109	111	113	115	117	120	122	124
447	126	128	130	132	134	136	138	141	143	146
448	148	151	153	155	157	159	161	163	165	167
449	169	171	173	175	177	179	181	183	185	187
450	189	191	192	194	196	198	201	203	205	208
451	210	213	215	218	221	223	226	229	231	234
452	236	239	242	245	248	250	253	256	259	261
453	264	267	270	272	275	278	281	283	286	289
454	292	295	297	300	303	306	309	312	315	318
455	321	324	327	330	333	336	339	342	345	348
456	352	355	358	362	365	368	372	375	379	382
457	386	389	393	397	401	404	408	412	416	420
458	424	429	433	437	441	445	450	454	458	463
459	467	471	476	480	485	490	495	500	505	510
460	515	520	525	531	536	541	547	552	558	563
461	569	575	581	586	592	598	604	610	616	621
462	627	634	640	647	654	660	666	673	679	685
463	692	698	704	710	716	723	729	735	741	747
464	754	760	767	774	781	787	794	801	808	815
465	821	829	836	844	852	860	868	876	884	892
466	900	907	915	923	932	940	949	957	966	974
467	983	991	1,000	1,009	1,017	1,027	1,036	1,045	1,054	1,064
468	1,073	1,083	1,093	1,103	1,113	1,124	1,136	1,147	1,158	1,167
469	1,177	1,187	1,197	1,207	1,216	1,226	1,235	1,244	1,254	1,263
470	1,273	1,282	1,291	1,300	1,308	1,317	1,325	1,334	1,342	1,351
471	1,359	1,367	1,375	1,383	1,391	1,399	1,407	1,415	1,423	1,431
472	1,439	1,447	1,455	1,463	1,471	1,479	1,487	1,495	1,503	1,510
473	1,518	1,526	1,534	1,542	1,550	1,558	1,567	1,575	1,583	1,591
474	1,600	1,608	1,616	1,625	1,634	1,642	1,651	1,659	1,668	1,676
475	1,685	1,694	1,702	1,711	1,719	1,728	1,736	1,745	1,754	1,763
476	1,772	1,781	1,790	1,800	1,809	1,819	1,829	1,840	1,852	1,863
477	1,874	1,885	1,896	1,908	1,920	1,932	1,944	1,956	1,969	1,981
478	1,993	2,005	2,018	2,031	2,043	2,055	2,068	2,081	2,093	2,105
479	2,117	2,130	2,142	2,155	2,167	2,181	2,194	2,208	2,222	2,235
480	2,250	2,264	2,278	2,291	2,305	2,319	2,334	2,348	2,362	2,377
481	2,392	2,408	2,424	2,440	2,456	2,473	2,492	2,514	2,534	2,555
482	2,576	2,597	2,620	2,643	2,665	2,689	2,713	2,736	2,760	2,782
483	2,804	2,825	2,847	2,870	2,893	2,917	2,941	2,966	2,992	3,019
484	3,047	3,079	3,112	3,142	3,169	3,195	3,221	3,248	3,274	3,299
485	3,324	3,349	3,374	3,399	3,425	3,450	3,475	3,501	3,525	3,549
486	3,571	3,594	3,618	3,641	3,664	3,690	3,715	3,738	3,759	3,780
487	3,802	3,824	3,847	3,869	3,892	3,916	3,940	3,962	3,983	4,003
488	4,023	4,044	4,066	4,089	4,112	4,134	4,156	4,177	4,198	4,221
489	4,241	4,261	4,281	4,301	4,320	4,340	4,361	4,382	4,403	4,425
490	4,448	4,471	4,493	4,515	4,535	4,555	4,574	4,593	4,612	4,630
491	4,649	4,669	4,689	4,710	4,731	4,750	4,769	4,788	4,807	4,827

Appendix B (continued)

Whitney Lake

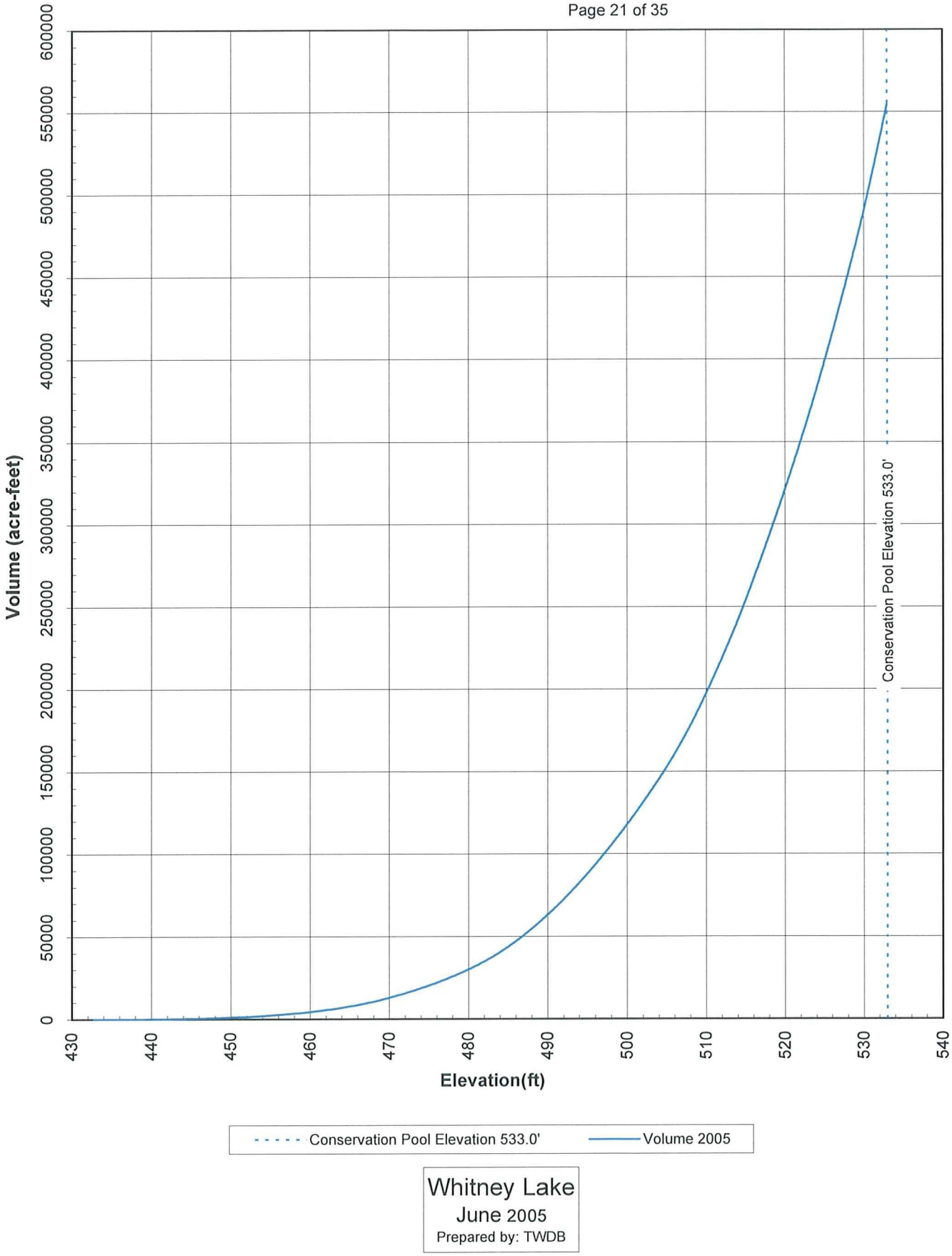
RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 2005 SURVEY

Conservation Pool Elevation 533.0'

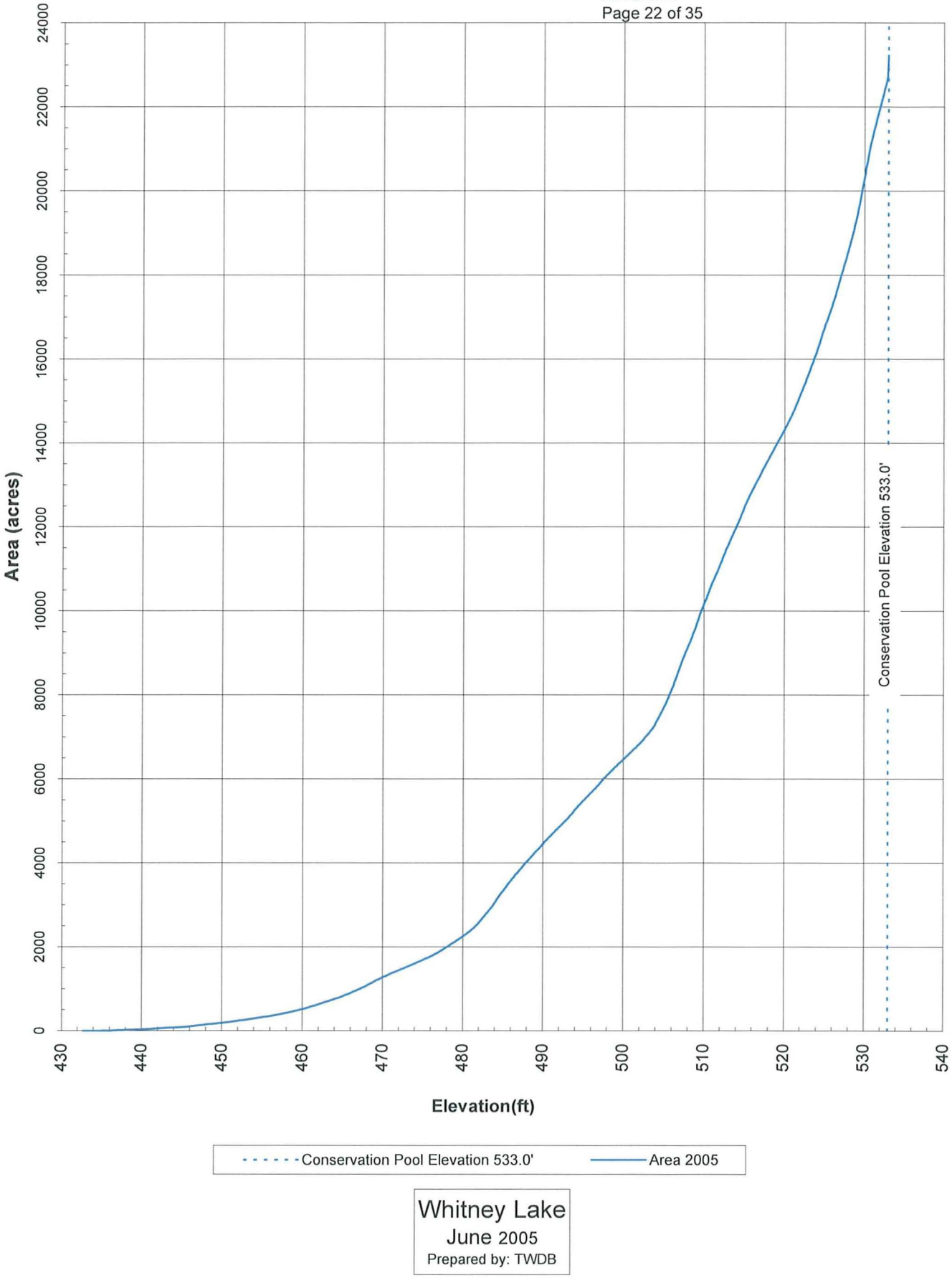
AREA IN ACRES — ELEVATION INCREMENT IS ONE TENTH FOOT

ELEVATION in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
492	4,847	4,866	4,885	4,904	4,923	4,942	4,961	4,980	5,000	5,020
493	5,041	5,061	5,082	5,103	5,123	5,145	5,169	5,193	5,218	5,244
494	5,268	5,291	5,313	5,334	5,355	5,375	5,395	5,415	5,434	5,455
495	5,475	5,495	5,515	5,534	5,553	5,571	5,590	5,610	5,629	5,648
496	5,669	5,691	5,710	5,729	5,748	5,767	5,786	5,807	5,828	5,849
497	5,870	5,892	5,915	5,938	5,960	5,982	6,003	6,024	6,043	6,062
498	6,080	6,099	6,118	6,138	6,157	6,177	6,197	6,217	6,237	6,256
499	6,274	6,292	6,310	6,329	6,347	6,366	6,384	6,402	6,420	6,439
500	6,458	6,477	6,496	6,515	6,533	6,552	6,570	6,588	6,606	6,625
501	6,643	6,661	6,679	6,697	6,716	6,734	6,753	6,772	6,791	6,810
502	6,829	6,848	6,867	6,886	6,908	6,937	6,962	6,986	7,008	7,030
503	7,053	7,075	7,098	7,120	7,144	7,168	7,193	7,220	7,251	7,286
504	7,324	7,363	7,400	7,436	7,472	7,510	7,547	7,584	7,621	7,658
505	7,695	7,733	7,773	7,813	7,858	7,905	7,951	7,996	8,040	8,085
506	8,132	8,179	8,227	8,279	8,336	8,390	8,443	8,493	8,545	8,597
507	8,652	8,706	8,758	8,811	8,861	8,909	8,955	9,000	9,044	9,089
508	9,136	9,182	9,226	9,272	9,324	9,374	9,424	9,474	9,524	9,574
509	9,626	9,682	9,742	9,807	9,864	9,917	9,968	10,018	10,065	10,112
510	10,158	10,206	10,254	10,302	10,350	10,400	10,452	10,503	10,554	10,601
511	10,648	10,693	10,737	10,781	10,825	10,868	10,912	10,958	11,004	11,051
512	11,099	11,148	11,198	11,247	11,294	11,342	11,390	11,436	11,483	11,529
513	11,572	11,614	11,655	11,697	11,739	11,779	11,818	11,859	11,901	11,942
514	11,983	12,025	12,069	12,112	12,157	12,201	12,246	12,292	12,339	12,387
515	12,436	12,484	12,530	12,573	12,614	12,655	12,695	12,734	12,772	12,809
516	12,847	12,885	12,923	12,960	12,998	13,035	13,072	13,109	13,144	13,180
517	13,221	13,262	13,302	13,342	13,379	13,413	13,450	13,487	13,524	13,559
518	13,594	13,629	13,665	13,702	13,738	13,775	13,813	13,851	13,889	13,925
519	13,960	13,994	14,028	14,062	14,096	14,130	14,164	14,198	14,232	14,266
520	14,301	14,336	14,371	14,407	14,445	14,484	14,524	14,561	14,598	14,635
521	14,674	14,714	14,756	14,801	14,846	14,892	14,939	14,987	15,034	15,081
522	15,129	15,176	15,221	15,267	15,313	15,361	15,411	15,462	15,514	15,564
523	15,614	15,663	15,713	15,765	15,818	15,870	15,924	15,978	16,031	16,084
524	16,140	16,196	16,253	16,314	16,376	16,441	16,504	16,564	16,622	16,679
525	16,735	16,791	16,847	16,902	16,956	17,010	17,065	17,119	17,174	17,230
526	17,287	17,345	17,403	17,463	17,526	17,594	17,665	17,734	17,800	17,864
527	17,926	17,989	18,052	18,115	18,178	18,241	18,305	18,368	18,433	18,500
528	18,567	18,635	18,705	18,776	18,848	18,923	18,998	19,075	19,154	19,236
529	19,320	19,407	19,494	19,583	19,676	19,770	19,871	19,974	20,079	20,187
530	20,296	20,404	20,512	20,619	20,726	20,827	20,926	21,022	21,114	21,199
531	21,280	21,359	21,435	21,510	21,584	21,657	21,731	21,805	21,878	21,952
532	22,026	22,100	22,174	22,248	22,323	22,398	22,472	22,547	22,622	22,697
533	23,220									



Whitney Lake
June 2005
Prepared by: TWDB

Appendix C Elevation vs. Volume



Whitney Lake
June 2005
Prepared by: TWDB

Appendix D Elevation vs. Area

Appendix E

Whitney Lake

RESERVOIR VOLUME COMPARISON TABLE

TEXAS WATER DEVELOPMENT BOARD

Conservation Pool Elevation 533.0'

TWDB 2005 SURVEY vs. USACE 1959 RESURVEY[2]

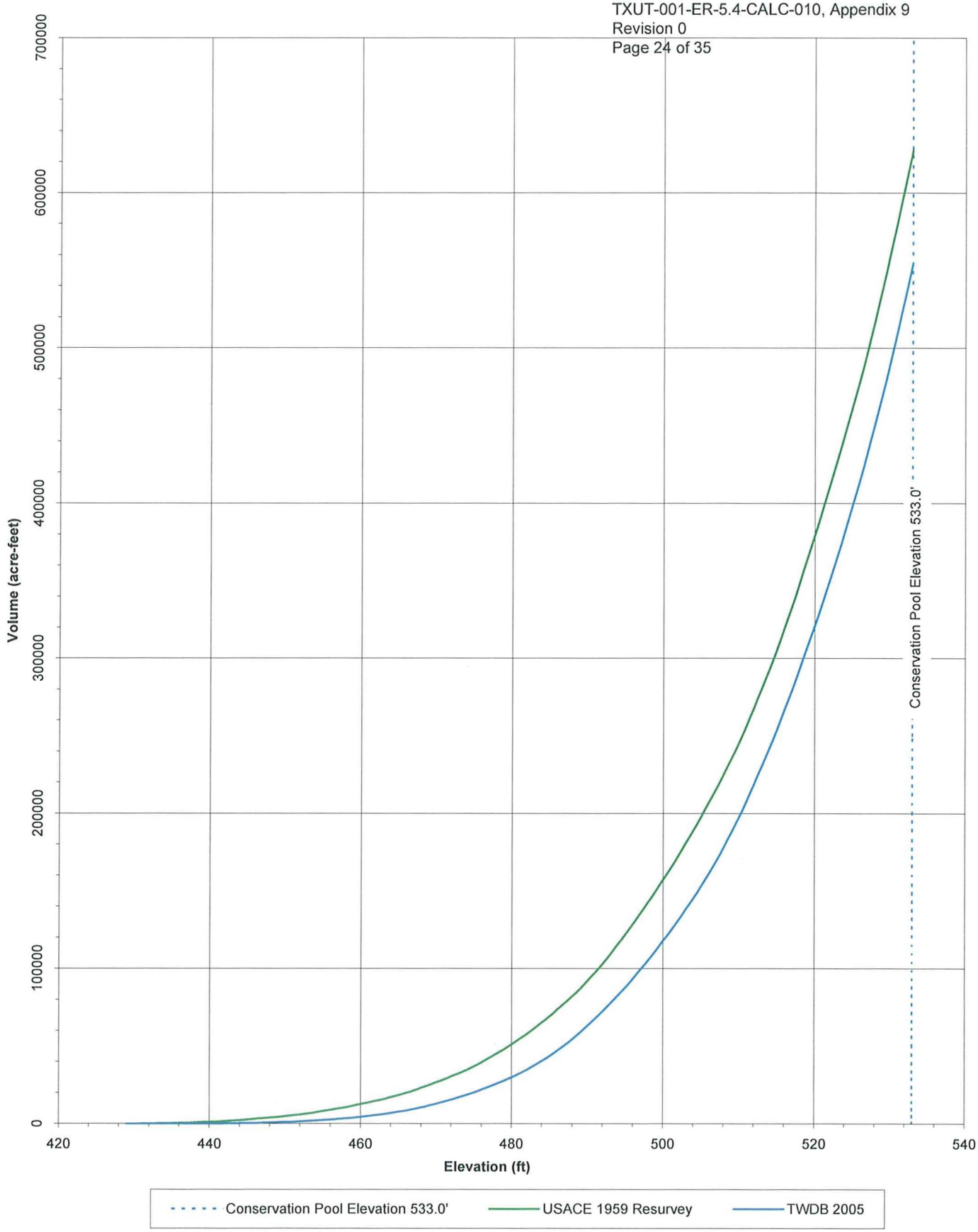
VOLUME IN ACRE-FEET

ELEVATION INCREMENT IS ONE FOOT

ELEVATION in feet	0	1	2	3	4	5	6	7	8	9
430	**0**	**0**	**0**	**0**	**0**	**2**	**5**	**15**	**31**	**55**
	9	43	110	180	260	340	450	580	730	920
440	**84**	**121**	**168**	**228**	**300**	**382**	**477**	**592**	**728**	**887**
	1,100	1,400	1,600	1,900	2,200	2,600	3,000	3,400	3,900	4,300
450	**1,066**	**1,265**	**1,488**	**1,739**	**2,017**	**2,323**	**2,659**	**3,027**	**3,432**	**3,877**
	4,800	5,400	5,900	6,600	7,300	8,100	8,900	9,700	10,600	11,600
460	**4,368**	**4,909**	**5,507**	**6,167**	**6,889**	**7,677**	**8,537**	**9,478**	**10,505**	**11,630**
	12,600	13,600	14,700	15,800	17,000	18,400	19,900	21,500	23,200	24,900
470	**12,855**	**14,172**	**15,571**	**17,050**	**18,608**	**20,250**	**21,978**	**23,799**	**25,731**	**27,787**
	26,700	28,500	30,500	32,500	34,700	37,000	39,600	42,300	45,100	48,100
480	**29,969**	**32,289**	**34,766**	**37,456**	**40,376**	**43,568**	**47,018**	**50,706**	**54,621**	**58,754**
	51,200	54,500	57,900	61,500	65,300	69,300	73,500	77,800	82,300	86,900
490	**63,095**	**67,648**	**72,397**	**77,339**	**82,489**	**87,863**	**93,434**	**99,203**	**105,182**	**111,359**
	91,900	97,200	102,900	109,000	115,400	121,900	128,600	135,500	142,600	149,800
500	**117,725**	**124,276**	**131,011**	**137,948**	**145,123**	**152,633**	**160,539**	**168,927**	**177,830**	**187,205**
	157,200	164,800	172,600	180,600	189,000	197,500	206,400	215,500	225,000	234,800
510	**197,112**	**207,515**	**218,385**	**229,725**	**241,503**	**253,707**	**266,358**	**279,392**	**292,804**	**306,581**
	245,200	256,200	267,800	279,800	292,300	305,400	319,100	333,400	348,200	363,500
520	**320,711**	**335,196**	**350,091**	**365,457**	**381,329**	**397,768**	**414,778**	**432,378**	**450,621**	**469,550**
	379,100	395,000	411,100	427,400	444,000	461,000	478,800	497,400	517,100	537,800
530	**489,334**	**510,148**	**531,805**	**554,203**						
	559,200	581,300	603,900	627,100						

TWDB 2005 Survey values on top

USACE 1959 Resurvey Values on Bottom



Whitney Lake
June 2005
Prepared by TWDB

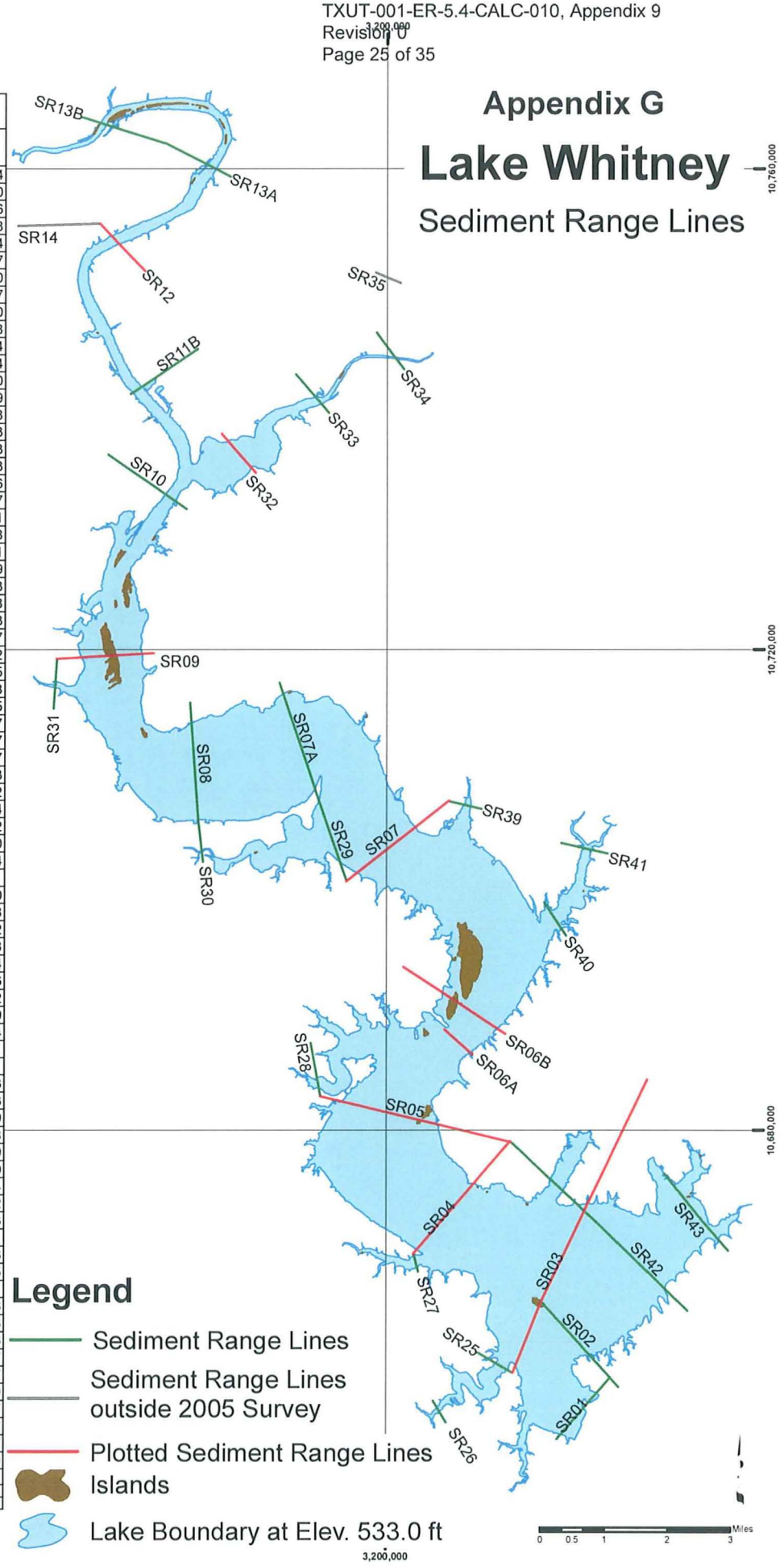
Appendix F Elevation vs. Volume Comparison

Appendix G

Lake Whitney

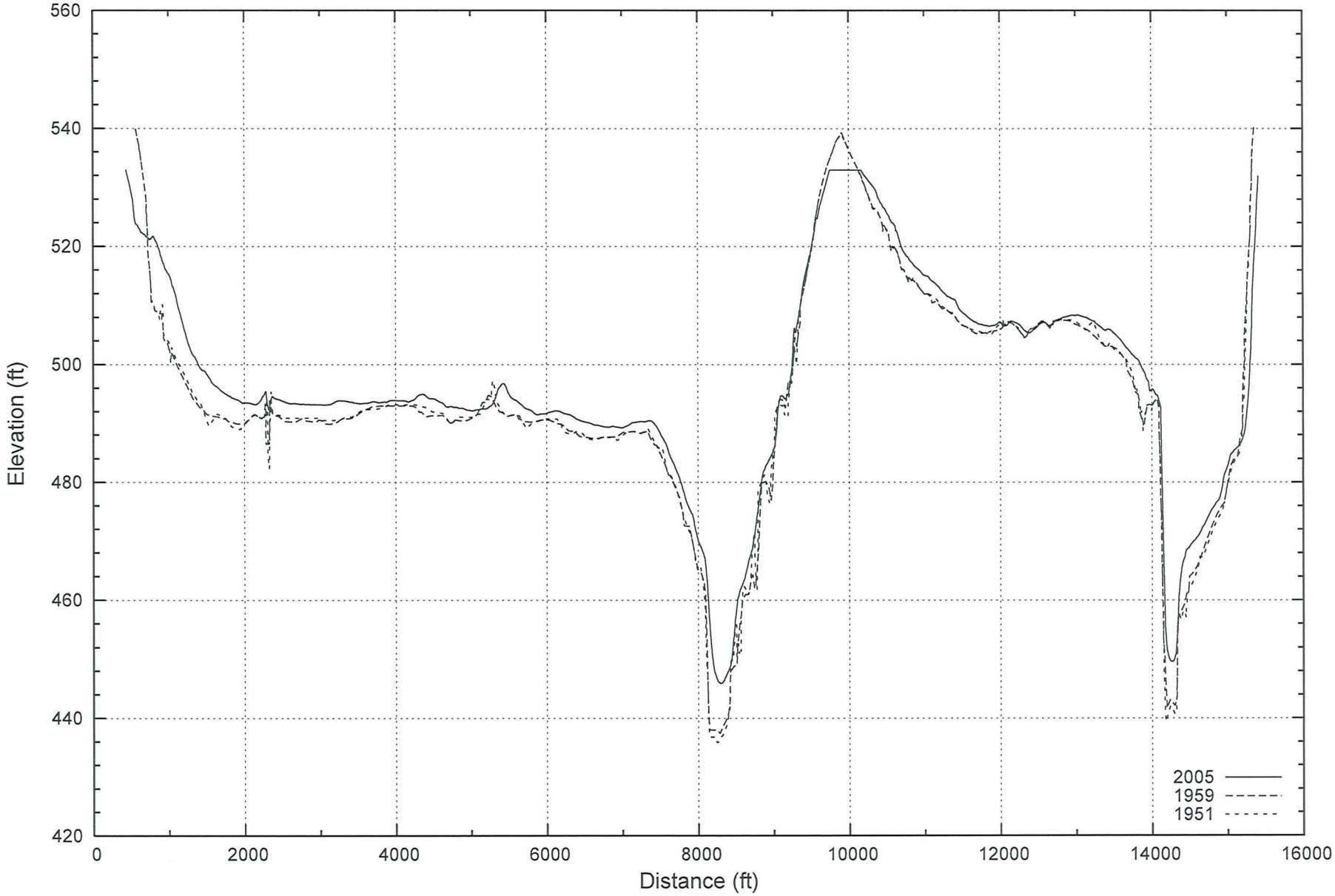
Sediment Range Lines

Table 3. Endpoint Coordinates for Whitney Lake Sediment Range Lines est. 2005 TWDB			
Range	L=Left R=Right	X	Y
SR01	L	3,218,623.047081	10,659,363.516084
	R	3,214,210.499983	10,654,246.000000
SR02	L	3,219,335.250020	10,658,572.999996
	R	3,212,934.550527	10,665,677.514418
SR03**	L	3,221,690.500012	10,684,212.000034
	R	3,210,542.499980	10,659,757.999987
SR04**	L	3,210,319.942514	10,679,007.215590
	R	3,202,271.499972	10,669,646.999997
SR05**	L	3,210,319.942514	10,679,007.215590
	R	3,194,539.750011	10,682,773.000018
SR06A**	L	3,207,211.249969	10,686,254.000034
	R	3,204,858.750002	10,688,358.999964
SR06B**	L	3,209,943.250031	10,687,987.000010
	R	3,201,432.249982	10,693,560.999989
SR07**	L	3,205,208.249966	10,707,405.999978
	R	3,196,721.255340	10,700,712.734643
SR07A	L	3,191,123.250010	10,717,236.000023
	R	3,194,144.499987	10,708,157.000023
SR08	L	3,183,691.249989	10,715,556.999966
	R	3,184,350.499984	10,705,787.999977
SR09**	L	3,180,634.749976	10,719,693.000011
	R	3,172,583.791081	10,719,215.390198
SR10	L	3,183,331.750005	10,731,680.000031
	R	3,176,858.749991	10,736,235.000029
SR11B	L	3,184,262.749972	10,745,016.000033
	R	3,178,722.000009	10,741,267.000008
SR12**	L	3,179,879.749966	10,751,510.000023
	R	3,176,103.499980	10,755,478.999977
SR13A	L	3,187,018.749965	10,759,338.000002
	R	3,181,478.500007	10,762,150.000005
SR13B	L	3,174,670.250016	10,764,298.999978
	R	3,181,478.500007	10,762,121.999965
SR14*	L	3,169,267.750025	10,755,257.999967
	R	3,176,103.499980	10,755,452.000017
SR15*	L	3,162,128.750026	10,754,707.000027
	R	3,161,191.500001	10,752,446.999973
SR16*	L	3,153,032.500012	10,759,393.000002
	R	3,151,020.249996	10,760,577.999994
SR17*	L	3,142,916.500009	10,766,365.999992
	R	3,142,585.750001	10,764,492.000020
SR18*	L	3,139,305.500025	10,777,281.999984
	R	3,138,891.999978	10,775,324.999971
SR19*	L	3,126,929.249965	10,780,617.000030
	R	3,127,425.499978	10,779,182.999988
SR25	L	3,207,623.750007	10,661,465.000012
	R	3,210,540.250032	10,659,756.999978
SR26	L	3,203,936.499971	10,657,444.000014
	R	3,205,019.749966	10,655,610.999986
SR27	L	3,202,294.249964	10,669,625.000012
	R	3,202,690.249995	10,668,209.999999
SR28	L	3,193,727.249978	10,687,245.999984
	R	3,194,529.249986	10,682,769.999991
SR29	L	3,194,144.499987	10,708,120.999981
	R	3,196,721.255340	10,700,712.734643
SR30	L	3,184,367.249994	10,705,793.000023
	R	3,184,761.250006	10,702,318.999999
SR31	L	3,172,583.791081	10,719,215.390198
	R	3,172,333.749980	10,715,069.000029
SR32**	L	3,189,141.749988	10,734,670.000010
	R	3,186,250.249976	10,737,957.999984
SR33	L	3,195,182.499999	10,739,681.000012
	R	3,192,449.249998	10,742,909.000013
SR34	L	3,201,401.249986	10,743,325.000011
	R	3,199,143.500024	10,746,354.999996
SR35*	L	3,201,150.749993	10,750,540.999995
	R	3,199,061.999996	10,751,392.000021
SR39	L	3,207,943.999990	10,706,699.999986
	R	3,205,174.750019	10,707,342.999976
SR40	L	3,214,965.999997	10,696,166.999976
	R	3,213,136.249999	10,698,936.000017
SR41	L	3,218,378.000029	10,702,990.999967
	R	3,214,570.499971	10,703,880.999990
SR42	L	3,225,103.499981	10,664,918.999997
	R	3,210,367.250030	10,679,012.000027
SR43	L	3,228,515.750015	10,669,913.999997
	R	3,223,175.000013	10,676,342.000030
Coordinates in NAD83 (feet) State Plane Texas Central Zone			
* Cross-Sections located outside extent of TWDB 2005 Survey			
** Cross-Sections selected for comparison, plotted			



Lake Whitney

Range Line SR03



Lake Whitney

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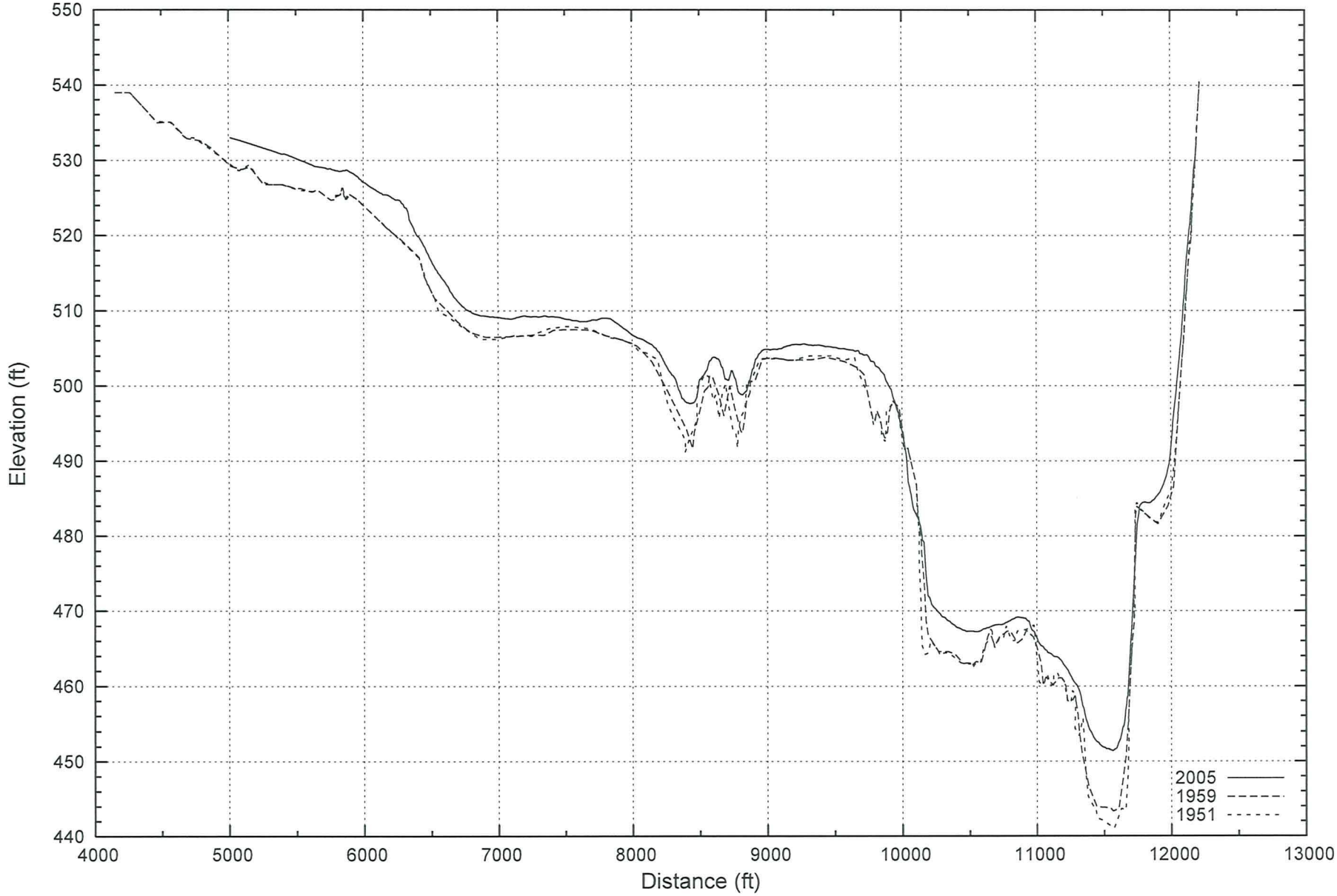
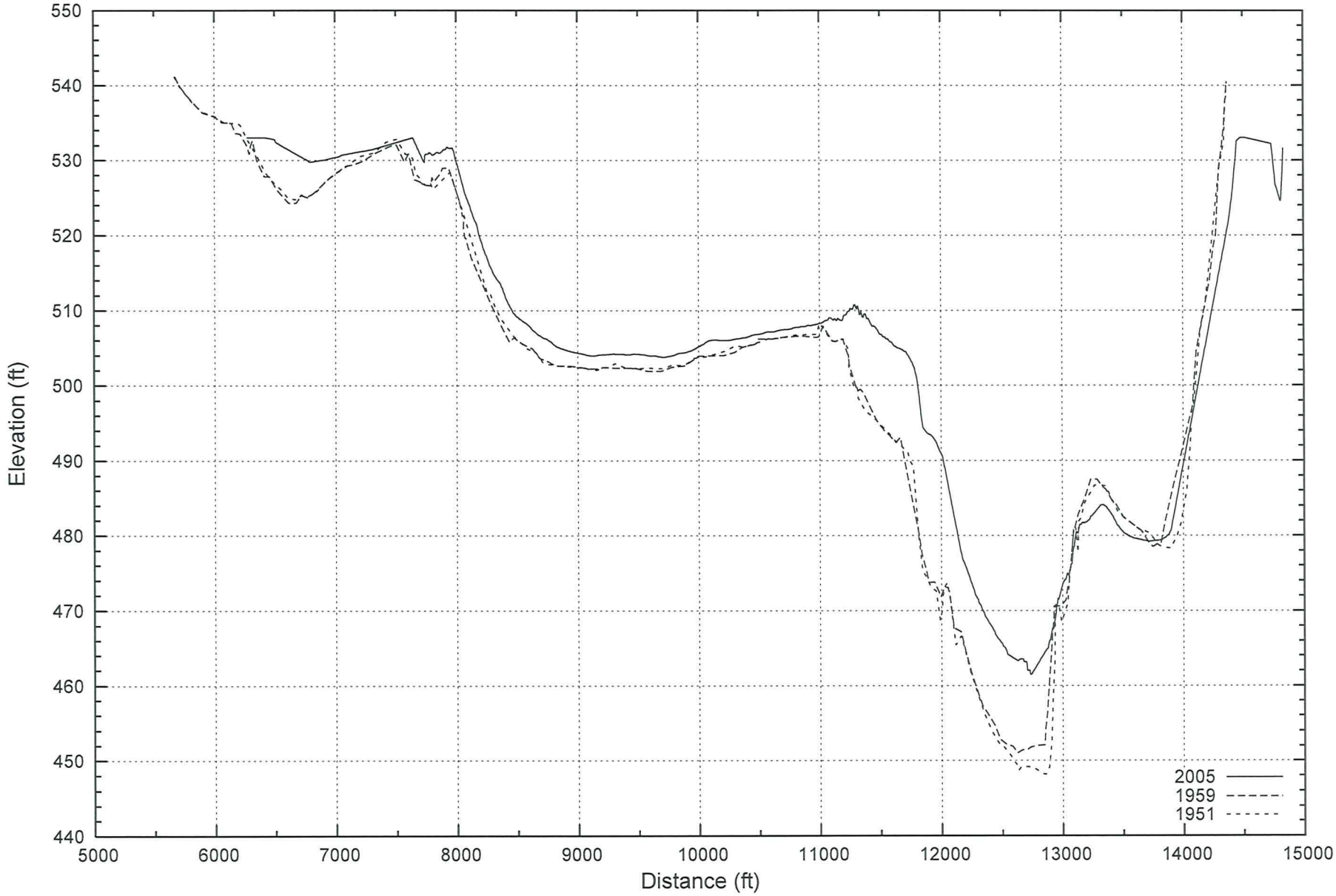


Lake Whitney

Range Line SR05



Lake Whitney

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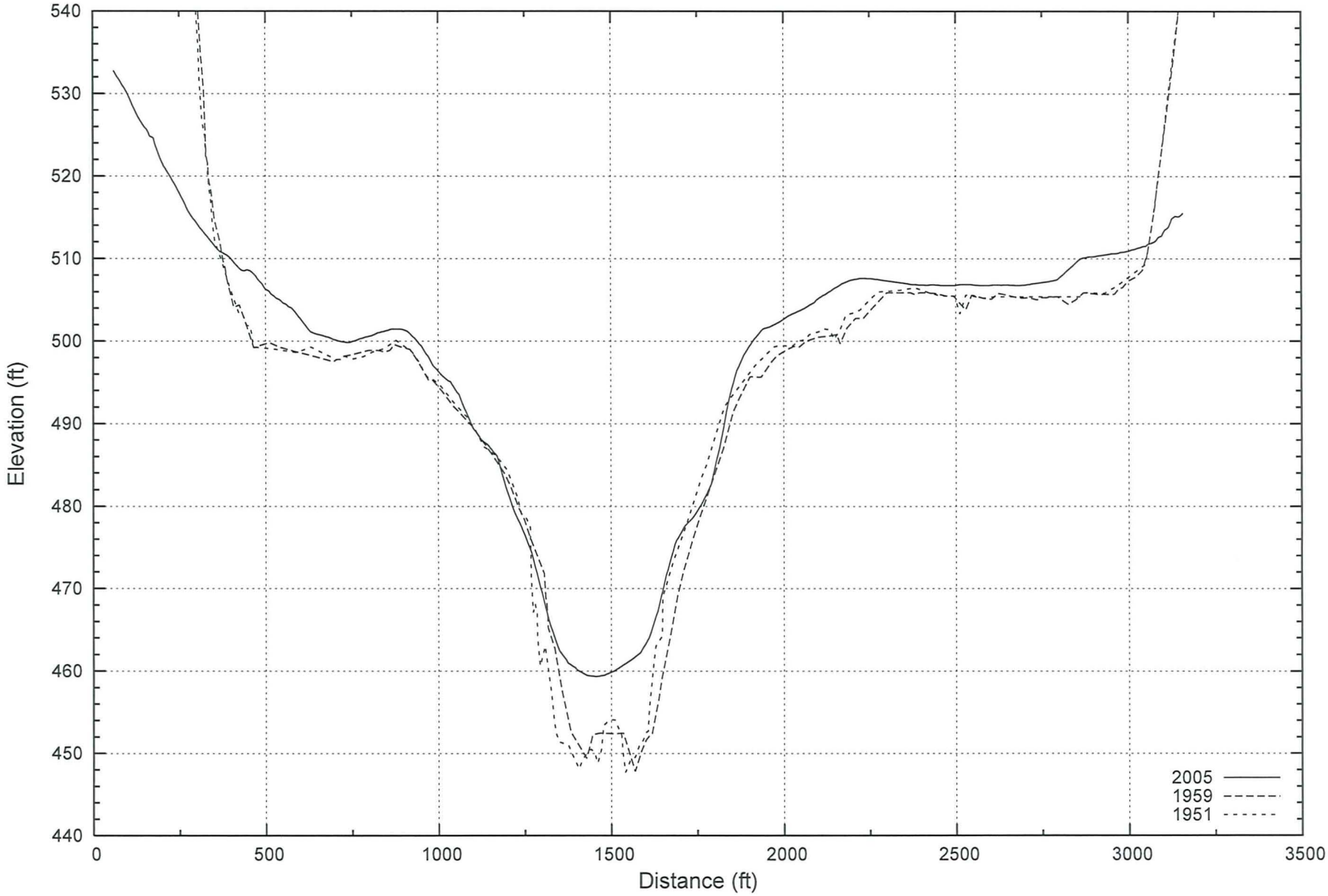
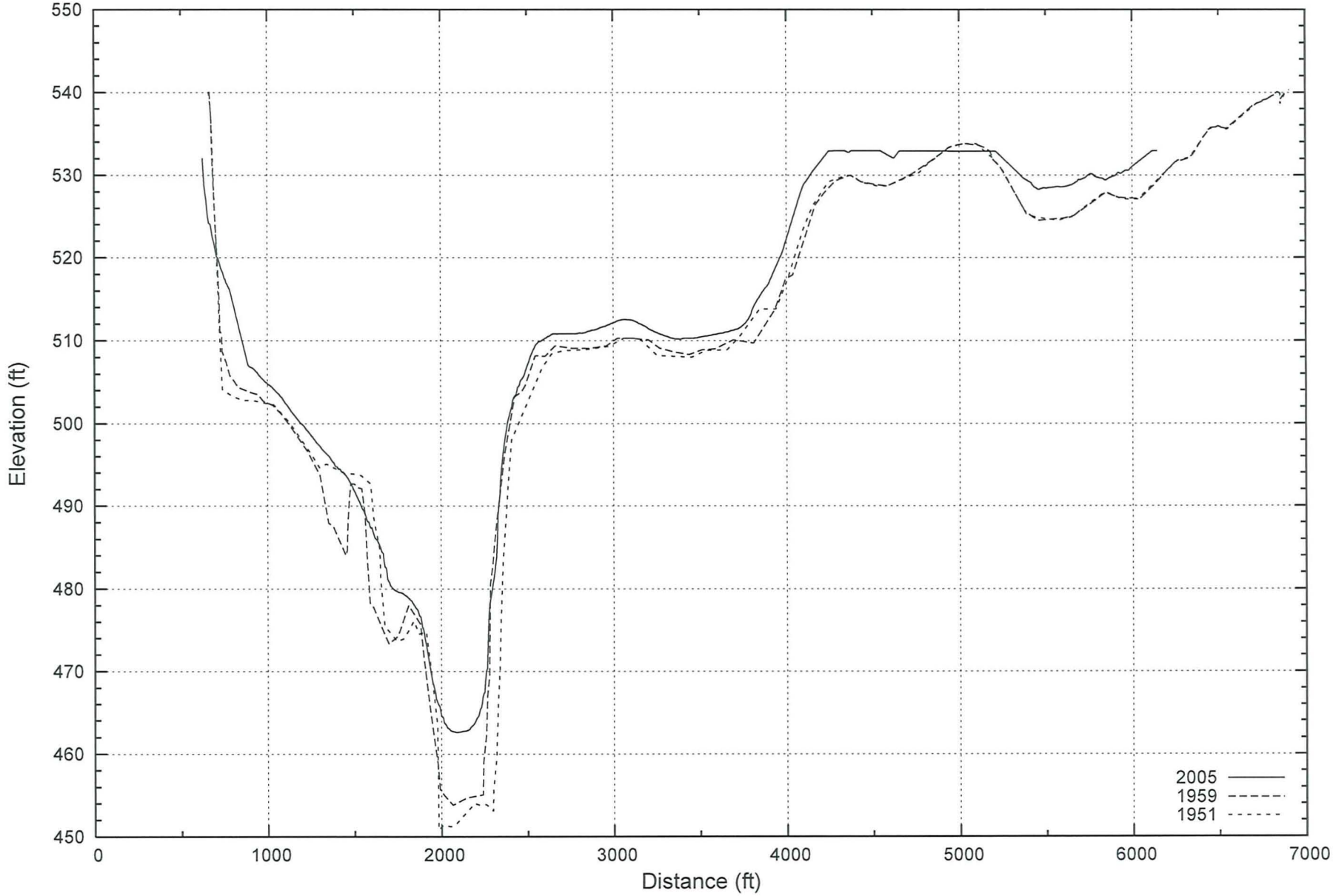


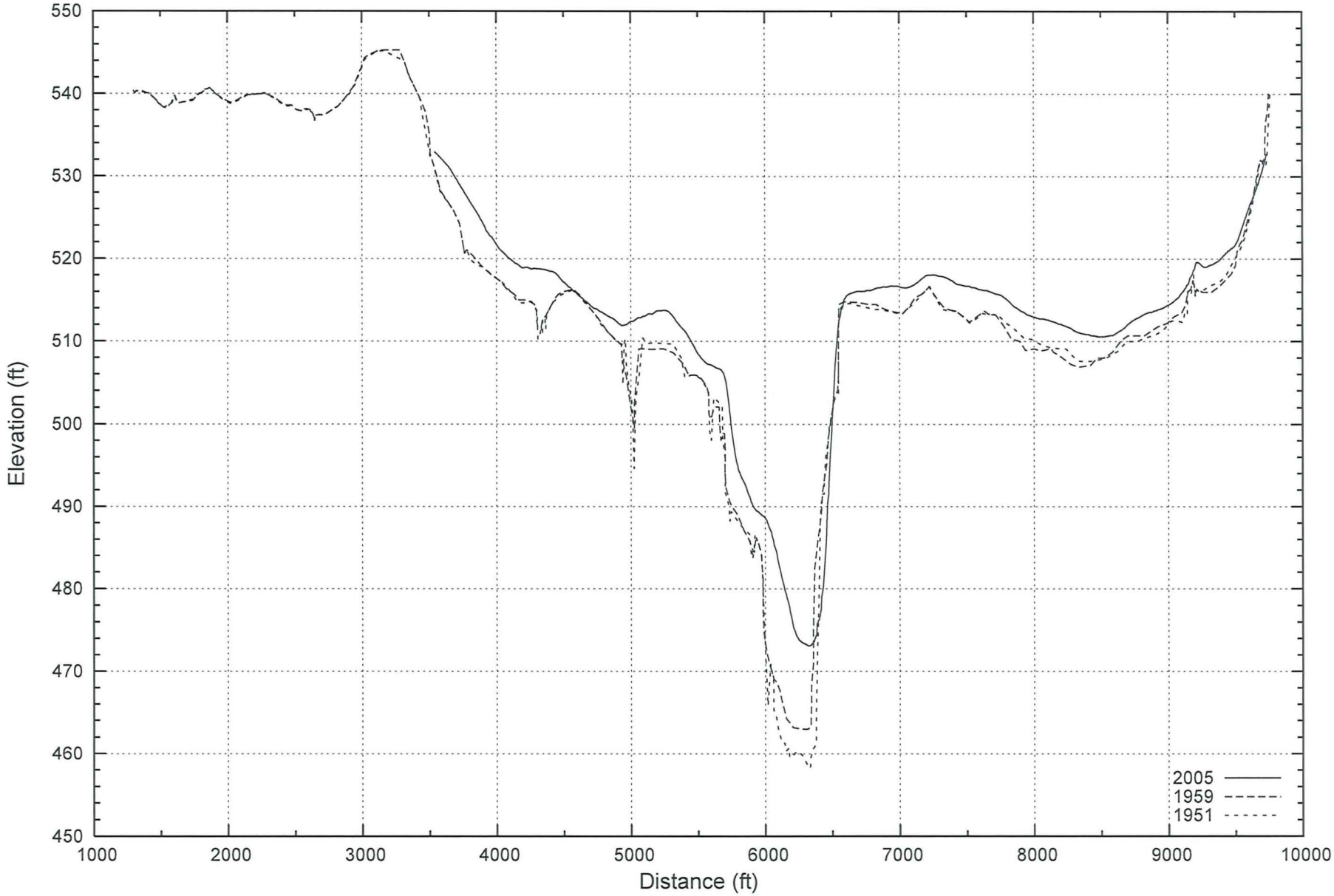
Lake Whitney

Range Line SR06B



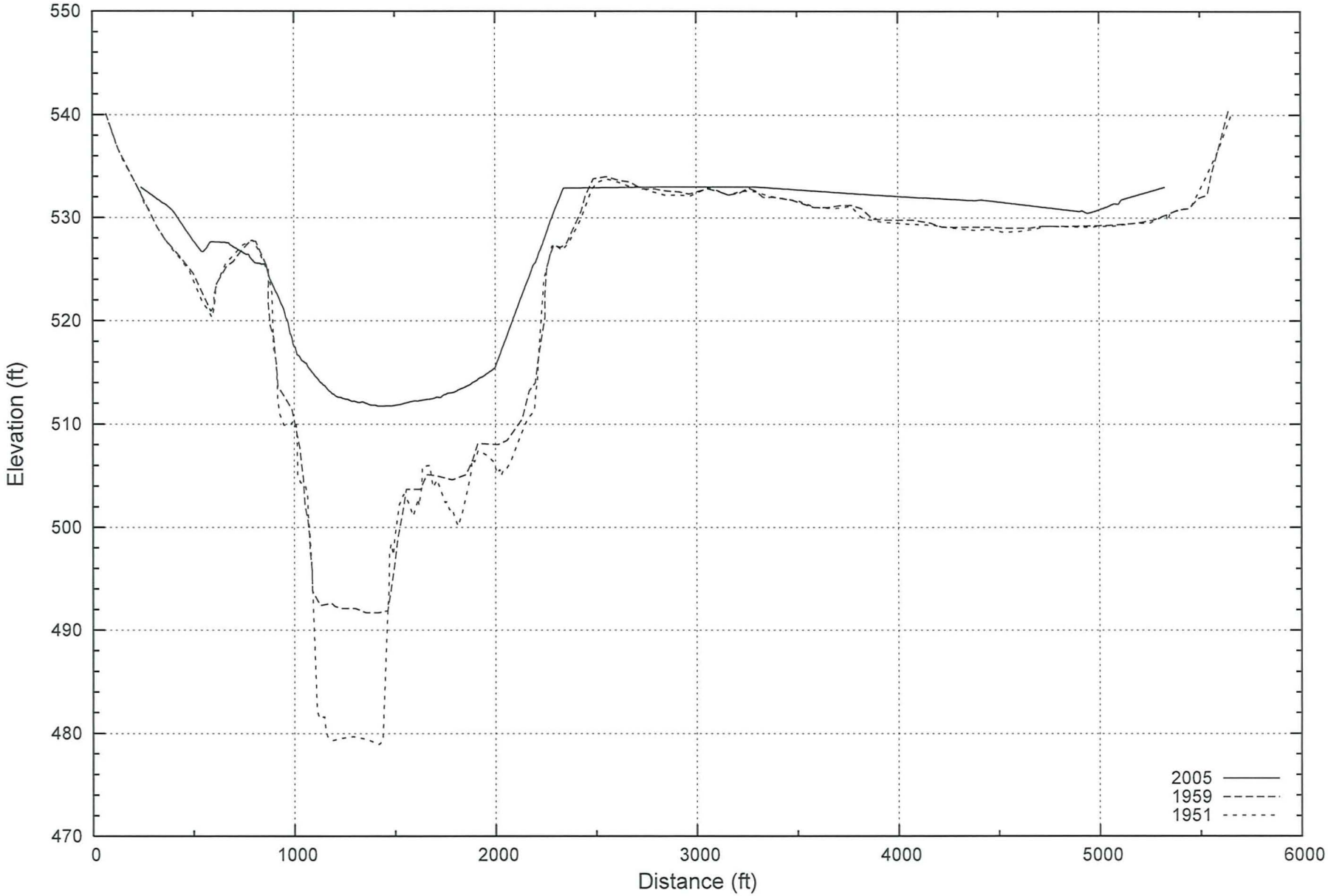
Lake Whitney

Range Line SR07



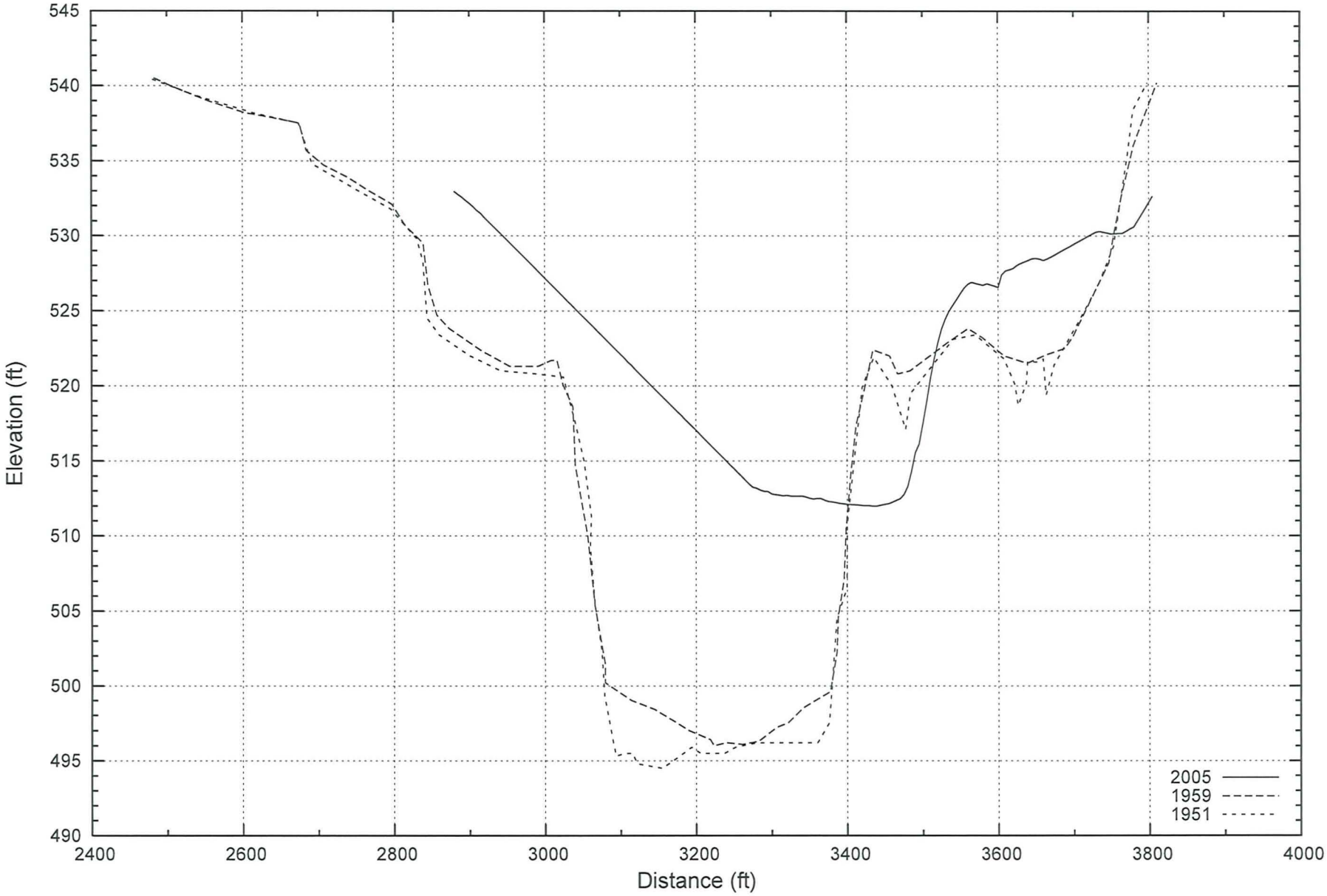
Lake Whitney

Range Line SR09



Lake Whitney

Range Line SR12



Lake Whitney

Range Line SR32

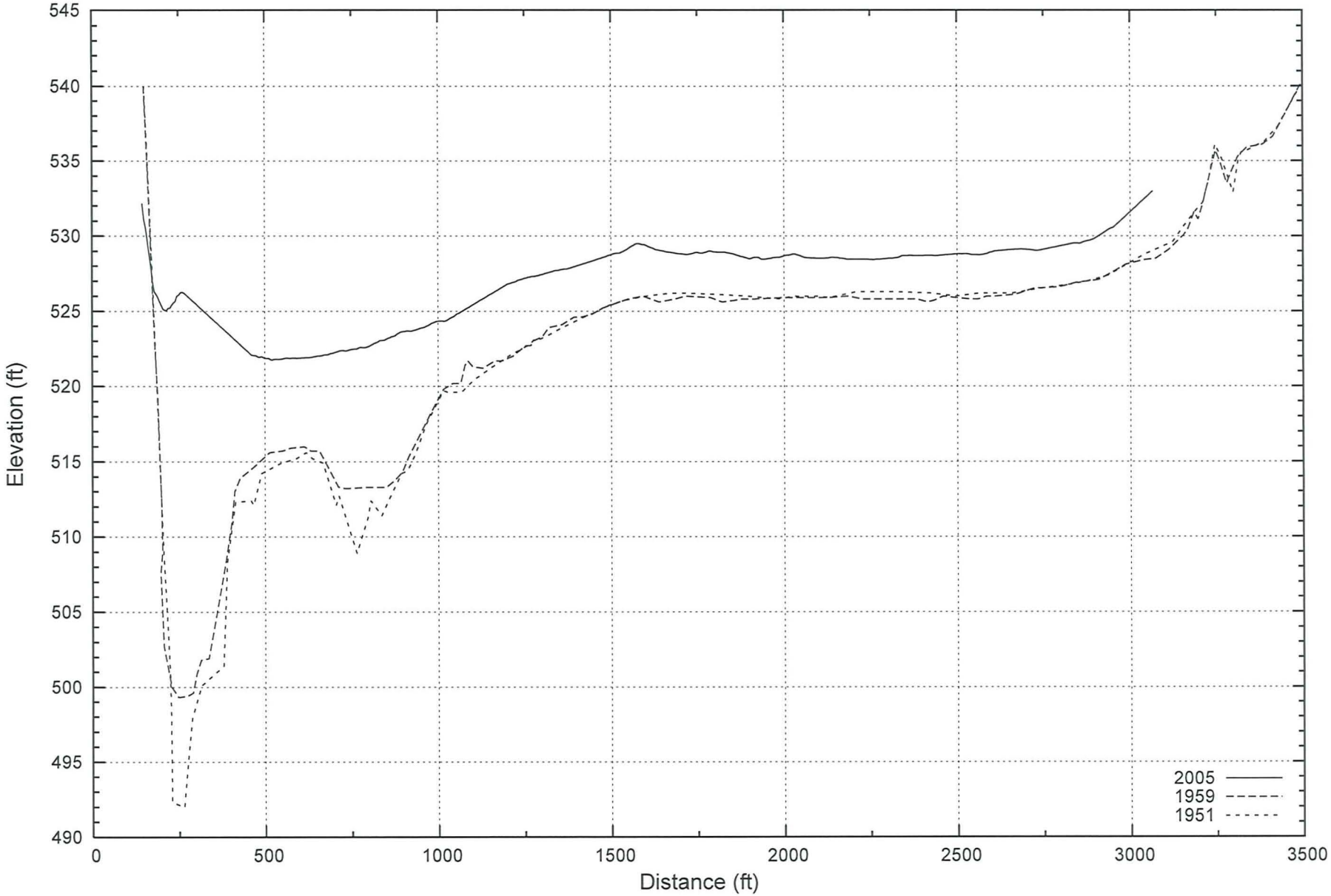
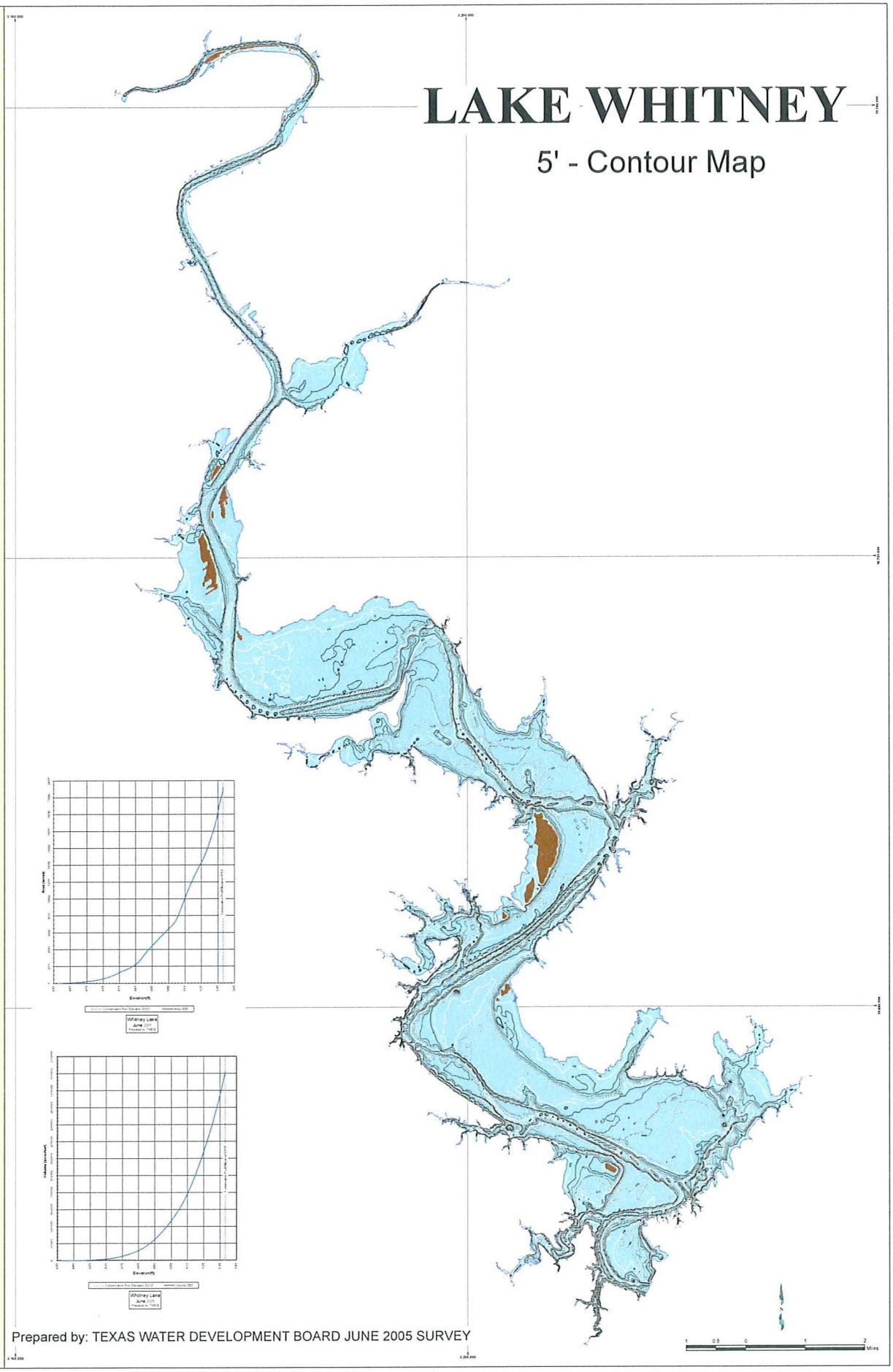


Figure 5

LAKE WHITNEY

5' - Contour Map



CONTOURS

- 435
- 440
- 445
- 450
- 455
- 460
- 465
- 470
- 475
- 480
- 485
- 490
- 495
- 500
- 505
- 510
- 515
- 520
- 525
- 530

Islands

Whitney Lake Elevation: 533.0' Conservation Pool Elevation

Projection: NAD83
State Plane
Texas Central Zone

Bosque and Hill Counties

This map is the product of a survey conducted by the Texas Water Development Board's Hydrographic Survey Program to determine the capacity of Whitney Lake. The Texas Water Development Board make no representation or assumes any liability.

Prepared by: TEXAS WATER DEVELOPMENT BOARD JUNE 2005 SURVEY

Appendix 10

Email from Sei Kudo, Mitsubishi Heavy Industries, Ltd., to Marvin Morris, et al., Enercon, Subject: Final Confirmation of Parameters

Joanne Morris

From:	sei_kudo@mhi.co.jp
Sent:	Tuesday, April 22, 2008 8:34 AM
To:	mamorris@enercon.com; jmorris@enercon.com; jmonroe@enercon.com
Cc:	bob.weltman@txu.com; mlaggart@enercon.com; Irving.Tsang@wgint.com; keiko_chitose@mnes-us.com; satoshi_hanada@mnes-us.com; yoshihisa_yamaura@mnes-us.com; hiroki_nishio@mhi.co.jp; hiromasa_nishino@mhi.co.jp; motoki_konno@mhi.co.jp; masatsugu_tsutsumi@mhi.co.jp; ryota_hirano@mhi.co.jp
Subject:	Final confirmation of parameters
Attachments:	Dose_calculation_conditions_CP34.doc; Table4 _Dose_Evaluation_Parameters_(LADTAP_Population).xls; Table1_Dose_Evaluation Parameters_(GASPAR_Individual).xls; Table2_Dose_Evaluation Parameters_(LADTAP_Individual).xls; Table3 _Dose_Evaluation_Parameters_(GASPAR_Population).xls

Dear Marvin Morris, Joanne Morris, jared Monroe,

I executed the re-arrangement of the spreadsheet of the dose evaluation parameters.

Please make new input data when the spillover rate of SCR is changed to 32900gpm.
(Please fill the numerical value under the frame in the balloon part.)

If these spreadsheets are completed, I think that we send these spreadsheets and your OHPs which you explained on 14th April to Luminant, the confirmation and approval of data are executed to Luminant.

Please arrange data finally immediately.

Thank you.

Best regards,
Seiichi Kudo (MHI)
(See attached file: Dose_calculation_conditions_CP34.doc)
(See attached file:
Table4_Dose_Evaluation_Parameters_(LADTAP_Population).xls)(See attached file: Table1_Dose_Evaluation Parameters_(GASPAR_Individual).xls)(See attached file: Table2_Dose_Evaluation Parameters_(LADTAP_Individual).xls)
(See attached file:
Table3_Dose_Evaluation_Parameters_(GASPAR_Population).xls)

TEXAS:BOSQUE COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

FARMS	2002	1997	1992	1987
NUMBER	1,285	1,236	966	968
ACREAGE	562,851	567,706	547,829	569,369
AVERAGE SIZE (ACRES)	438	459	567	588
MEDIAN SIZE (ACRES)	184	190	N	N
AVERAGE ESTIMATED MARKET VALUE PER FARM ($)				
LAND & BUILDINGS	634,453	460,813	414,516	544,961
MACHINERY & EQUIPMENT	22,018	30,367	26,107	22,542
CROPLAND (ACRES)				
TOTAL	136,770	138,134	132,544	137,194
HARVESTED	46,538	51,711	51,687	56,749
IRRIGATED	1,592	2,853	2,690	1,536
MARKET VALUE AGRICULTURAL PRODUCTS SOLD				
COUNTY TOTAL VALUE ($1,000)	37,950	41,626	38,656	24,627
AVERAGE PER FARM ($)	29,533	33,678	40,017	25,442
NET CASH SALES RETURN PER FARM				
AVERAGE ($)	6,202	-557	4,491	531
LIVESTOCK (INVENTORY)				
CATTLE & CALVES	59,941	59,510	59,462	57,239
BEEF COWS	D	29,977	30,536	27,721
MILK COWS	D	999	858	919
HOGS & PIGS	281	153	517	3,123
SHEEP & LAMBS	1,790	1,668	2,379	8,783
LAYERS (20 WEEKS OR OLDER)	1,427	D	1,295	1,470
BROILER & CHICKEN (SOLD)	D	D	0	D
COMMODITY HARVESTED (ACRES)				
CORN, GRAIN OR SEED	1,003	2,034	1,489	1,519
CORN, SILAGE OR GREENCHOP	N	N	N	N
SORGHUM, GRAIN OR SEED	1,668	2,934	3,897	3,428
WHEAT	3,475	10,275	13,705	20,082
BARLEY	N	N	N	N
OATS	2,206	N	N	N
RICE	0	0	0	0
SUNFLOWER SEED	N	N	N	N
COTTON	D	D	0	D
TOBACCO	N	N	N	N
SOYBEANS	0	0	0	0
DRY EDIBLE BEANS, EXCL. LIMAS	N	N	N	N
POTATOES EXCL. SWEET POTATOES	N	N	N	N
SUGARBEETS FOR SUGAR	N	N	N	N
SUGARCANE FOR SUGAR	N	N	N	N
PEANUTS FOR NUTS	N	N	N	N
FORAGE LAND (ALFALFA, HAY,) 1/	36,020	32,863	29,480	25,634

TEXAS: BOSQUE COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

	2002	1997	1992	1987
VEGETABLES FOR SALE				
NUMBER OF FARMS	1	N	N	N
ACREAGE	N	N	N	N
ORCHARDS				
NUMBER OF FARMS	N	N	N	N
ACREAGE	2,024	N	N	N
PRIMARY OPERATOR'S OCCUPATION (NUMBER)				
FARMING	632	N/A	N/A	N/A
NON-FARMING	653	N/A	N/A	N/A
GOVERNMENT PAYMENT PROGRAM PARTICIPATION				
NUMBER OF FARMS	229	N/A	N/A	N/A
PERCENT OF TOTAL	17.82%	N/A	N/A	N/A
TOTAL PAYMENTS RECEIVED ($1,000)	1,453	467	N/A	N/A
AVERAGE PAYMENT RECEIVED PER FARM ($)	6,344	2,233	N/A	N/A

1/AREA COUNTED ONLY ONCE (ALL HAY, ALFALFA, SMALL GRAIN, GRASS SILAGE, GREENCHOP).
N - REPRESENTS ZERO.
0 - REPRESENTS AN INSIGNIFICANT AMOUNT.
D - WITHHELD TO AVOID DISCLOSING DATA FOR INDIVIDUAL FARMS.
Z - LESS THAN HALF OF THE UNIT SHOWN

SOURCE: USDA, NASS, 2002 CENSUS OF AGRICULTURE.

TEXAS: HILL COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

FARMS	2002	1997	1992	1987
NUMBER	2,014	1,827	1,494	1,501
ACREAGE	504,322	487,570	470,096	441,837
AVERAGE SIZE (ACRES)	250	267	315	294
MEDIAN SIZE (ACRES)	105	114	N	N
AVERAGE ESTIMATED MARKET VALUE PER FARM ($)				
LAND & BUILDINGS	315,967	247,421	239,307	237,147
MACHINERY & EQUIPMENT	42,506	44,398	31,069	30,378
CROPLAND (ACRES)				
TOTAL	294,300	292,375	299,242	296,402
HARVESTED	211,217	191,818	184,543	166,983
IRRIGATED	3,864	1,075	656	496
MARKET VALUE AGRICULTURAL PRODUCTS SOLD				
COUNTY TOTAL VALUE ($1,000)	54,019	59,824	44,508	36,027
AVERAGE PER FARM ($)	26,822	32,744	29,791	24,002
NET CASH SALES RETURN PER FARM				
AVERAGE ($)	2,259	726	3,645	3,969
LIVESTOCK (INVENTORY)				
CATTLE & CALVES	63,681	66,470	56,302	55,602
BEEF COWS	34,604	32,264	27,242	26,228
MILK COWS	2,906	3,487	4,481	4,500
HOGS & PIGS	578	312	1,189	2,489
SHEEP & LAMBS	1,830	1,166	1,091	442
LAYERS (20 WEEKS OR OLDER)	3,263	916	1,125	2,546
BROILER & CHICKEN (SOLD)	120	D	14	0
COMMODITY HARVESTED (ACRES)				
CORN, GRAIN OR SEED	44,251	24,946	26,342	15,239
CORN, SILAGE OR GREENCHOP	14,962	N	N	N
SORGHUM, GRAIN OR SEED	43,211	56,623	67,621	58,090
WHEAT	48,118	52,072	36,015	46,654
BARLEY	N	N	N	N
OATS	1,053	N	N	N
RICE	0	0	0	0
SUNFLOWER SEED	N	N	N	N
COTTON	15,387	19,972	19,116	16,370
TOBACCO	N	N	N	N
SOYBEANS	312	D	D	0
DRY EDIBLE BEANS, EXCL. LIMAS	N	N	N	N
POTATOES EXCL. SWEET POTATOES	N	N	N	N
SUGARBEETS FOR SUGAR	N	N	N	N
SUGARCANE FOR SUGAR	N	N	N	N
PEANUTS FOR NUTS	N	N	N	N
FORAGE LAND (ALFALFA, HAY,) 1/	48,822	40,250	32,008	25,964

TEXAS: HILL COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

	2002	1997	1992	1987
VEGETABLES FOR SALE				
NUMBER OF FARMS	11	N	N	N
ACREAGE	375	N	N	N
ORCHARDS				
NUMBER OF FARMS	N	N	N	N
ACREAGE	467	N	N	N
PRIMARY OPERATOR'S OCCUPATION (NUMBER)				
FARMING	1,060	N/A	N/A	N/A
NON-FARMING	954	N/A	N/A	N/A
GOVERNMENT PAYMENT PROGRAM PARTICIPATION				
NUMBER OF FARMS	411	N/A	N/A	N/A
PERCENT OF TOTAL	20.41%	N/A	N/A	N/A
TOTAL PAYMENTS RECEIVED ($1,000)	3,469	2,565	N/A	N/A
AVERAGE PAYMENT RECEIVED PER FARM ($)	8,441	5,182	N/A	N/A

1/AREA COUNTED ONLY ONCE (ALL HAY, ALFALFA, SMALL GRAIN, GRASS SILAGE, GREENCHOP).
N - REPRESENTS ZERO.
0 - REPRESENTS AN INSIGNIFICANT AMOUNT.
D - WITHHELD TO AVOID DISCLOSING DATA FOR INDIVIDUAL FARMS.
Z - LESS THAN HALF OF THE UNIT SHOWN

SOURCE: USDA, NASS, 2002 CENSUS OF AGRICULTURE.

TEXAS: JOHNSON COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

FARMS	2002	1997	1992	1987
NUMBER	2,579	2,511	1,763	1,867
ACREAGE	362,004	352,785	330,173	312,129
AVERAGE SIZE (ACRES)	140	140	187	167
MEDIAN SIZE (ACRES)	49	50	N	N
AVERAGE ESTIMATED MARKET VALUE PER FARM ($)				
LAND & BUILDINGS	282,853	300,556	271,612	297,388
MACHINERY & EQUIPMENT	23,935	25,295	25,912	19,646
CROPLAND (ACRES)				
TOTAL	167,128	175,035	176,036	162,328
HARVESTED	80,868	85,455	82,472	75,345
IRRIGATED	1,004	882	793	645
MARKET VALUE AGRICULTURAL PRODUCTS SOLD				
COUNTY TOTAL VALUE ($1,000)	43,601	49,799	51,388	56,000
AVERAGE PER FARM ($)	16,906	19,833	29,148	29,995
NET CASH SALES RETURN PER FARM				
AVERAGE ($)	182	2,042	1,648	3,012
LIVESTOCK (INVENTORY)				
CATTLE & CALVES	67,520	81,577	74,307	64,423
BEEF COWS	27,436	34,379	22,806	19,265
MILK COWS	8,080	13,649	16,340	15,273
HOGS & PIGS	823	2,151	1,950	3,119
SHEEP & LAMBS	1,111	813	218	460
LAYERS (20 WEEKS OR OLDER)	5,875	2,640	45,731	36,447
BROILER & CHICKEN (SOLD)	2,384	D	D	359
COMMODITY HARVESTED (ACRES)				
CORN, GRAIN OR SEED	1,539	1,405	3,573	1,417
CORN, SILAGE OR GREENCHOP	709	N	N	N
SORGHUM, GRAIN OR SEED	8,053	10,407	19,320	15,334
WHEAT	12,769	15,104	7,686	21,459
BARLEY	N	N	N	N
OATS	1,204	N	N	N
RICE	0	0	0	0
SUNFLOWER SEED	N	N	N	N
COTTON	623	1,205	2,200	894
TOBACCO	N	N	N	N
SOYBEANS	394	D	D	105
DRY EDIBLE BEANS, EXCL. LIMAS	N	N	N	N
POTATOES EXCL. SWEET POTATOES	N	N	N	N
SUGARBEETS FOR SUGAR	N	N	N	N
SUGARCANE FOR SUGAR	N	N	N	N
PEANUTS FOR NUTS	N	N	N	N
FORAGE LAND (ALFALFA, HAY,) 1/	55,173	55,182	47,461	36,854

TEXAS: JOHNSON COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

	2002	1997	1992	1987
VEGETABLES FOR SALE				
NUMBER OF FARMS	13	N	N	N
ACREAGE	33	N	N	N
ORCHARDS				
NUMBER OF FARMS	N	N	N	N
ACREAGE	645	N	N	N
PRIMARY OPERATOR'S OCCUPATION (NUMBER)				
FARMING	1,115	N/A	N/A	N/A
NON-FARMING	1,464	N/A	N/A	N/A
GOVERNMENT PAYMENT PROGRAM PARTICIPATION				
NUMBER OF FARMS	293	N/A	N/A	N/A
PERCENT OF TOTAL	11.36%	N/A	N/A	N/A
TOTAL PAYMENTS RECEIVED ($1,000)	1,575	738	N/A	N/A
AVERAGE PAYMENT RECEIVED PER FARM ($)	5,377	3,601	N/A	N/A

1/AREA COUNTED ONLY ONCE (ALL HAY, ALFALFA, SMALL GRAIN, GRASS SILAGE, GREENCHOP).
N - REPRESENTS ZERO.
0 - REPRESENTS AN INSIGNIFICANT AMOUNT.
D - WITHHELD TO AVOID DISCLOSING DATA FOR INDIVIDUAL FARMS.
Z - LESS THAN HALF OF THE UNIT SHOWN

SOURCE: USDA, NASS, 2002 CENSUS OF AGRICULTURE

MCLENNAN COUNTY, TX

Information based on Congressional Districts of the 106th U.S. Congress, 1997

	1997	1992	1987
Farms			
Number	2,006	1,847	1,977
Acreage	492,599	472,332	445,252
Average size (acres)	246	256	225
Median size (acres)	71	N	N
Estimated market value average per farm			
Land/buildings (dollars)	237,070	211,619	191,918
Machinery/equip (dollars)	33,677	26,487	25,173
Cropland (acres)			
Total	299,286	271,604	268,589
Harvested	178,252	172,860	150,505
Irrigated	1,596	627	796
Agricultural products sold - market value			
($1,000)	92,952	68,501	79,049
(dollars avg. per farm)	46,337	37,088	39,984
Agricultural sales - Net cash return per farm			
(dollars average)	569	5,192	11,923
Livestock inventory (number)			
Cattle and calves	93,735	77,947	76,417
Beef cows	35,227	33,788	30,873
Milk cows	4,961	5,685	4,307
Hogs and pigs	1,106	2,520	3,853
Sheep and lambs	2,875	2,719	3,154
Layers 13 wks or/older	D	D	D
Broilers and chicken (sold)	D	0	333
Harvested commodities (acres)			
Corn, grain or seed	48,943	61,137	29,854
Corn, silage or green chop	N	N	N
Sorghum, grain or seed	25,348	27,531	33,324
Wheat	41,520	26,231	36,325
Barley	N	N	N
Oats	N	N	N
Rice	0	0	0
Sunflower seed	N	N	N
Cotton	8,642	9,588	2,929
Tobacco	N	N	N
Soybeans	2,599	1,585	D
Dry edible beans, excl limas	N	N	N
Potatoes, excl sweetpotatoes	N	N	N
Sugar beets for sugar	N	N	N
Sugarcane for sugar	N	N	N
Peanuts for nuts	N	N	N
Hay-alfalfa	46,748	40,120	36,198
Vegetables			
Number of farms	N	N	N
Acreage	N	N	N

Orchards			
Number of farms	N	N	N
Acreage	N	N	N

Abbreviations/footnotes:

N represents zero.

0 represents an insignificant amount.

D-Withheld to avoid disclosing data for individual farms.

Source: USDA, NASS, 1997 Census of Agriculture

TEXAS: SOMERVELL COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

FARMS	2002	1997	1992	1987
NUMBER	339	294	229	234
ACREAGE	84,262	77,269	62,850	65,054
AVERAGE SIZE (ACRES)	249	263	274	278
MEDIAN SIZE (ACRES)	100	110	N	N
AVERAGE ESTIMATED MARKET VALUE PER FARM ($)				
LAND & BUILDINGS	351,964	300,980	282,935	258,082
MACHINERY & EQUIPMENT	15,661	19,491	23,348	19,861
CROPLAND (ACRES)				
TOTAL	21,777	19,502	22,054	21,166
HARVESTED	6,736	5,905	7,691	6,007
IRRIGATED	129	86	63	410
MARKET VALUE AGRICULTURAL PRODUCTS SOLD				
COUNTY TOTAL VALUE ($1,000)	2,025	2,342	2,351	2,201
AVERAGE PER FARM ($)	5,975	7,967	10,266	9,407
NET CASH SALES RETURN PER FARM				
AVERAGE ($)	-2,219	-920	1,339	-1,624
LIVESTOCK (INVENTORY)				
CATTLE & CALVES	6,876	8,553	7,487	6,881
BEEF COWS	3,954	D	D	3,574
MILK COWS	12	D	D	306
HOGS & PIGS	17	100	29	186
SHEEP & LAMBS	489	133	190	141
LAYERS (20 WEEKS OR OLDER)	421	D	D	746
BROILER & CHICKEN (SOLD)	0	0	0	0
COMMODITY HARVESTED (ACRES)				
CORN, GRAIN OR SEED	0	0	D	D
CORN, SILAGE OR GREENCHOP	N	N	N	N
SORGHUM, GRAIN OR SEED	D	90	126	279
WHEAT	D	180	D	D
BARLEY	N	N	N	N
OATS	N	N	N	N
RICE	0	0	0	0
SUNFLOWER SEED	N	N	N	N
COTTON	0	0	0	0
TOBACCO	N	N	N	N
SOYBEANS	0	0	0	0
DRY EDIBLE BEANS, EXCL. LIMAS	N	N	N	N
POTATOES EXCL. SWEET POTATOES	N	N	N	N
SUGARBEETS FOR SUGAR	N	N	N	N
SUGARCANE FOR SUGAR	N	N	N	N
PEANUTS FOR NUTS	N	N	N	N
FORAGE LAND (ALFALFA, HAY,) 1/	6,045	4,829	5,318	3,526

TEXAS: SOMERVELL COUNTY

Transportation and Marketing

STATISTICS FROM THE CENSUS OF AGRICULTURE (5-YEAR CYCLE)

	2002	1997	1992	1987
VEGETABLES FOR SALE				
NUMBER OF FARMS	4	N	N	N
ACREAGE	14	N	N	N
ORCHARDS				
NUMBER OF FARMS	N	N	N	N
ACREAGE	664	N	N	N
PRIMARY OPERATOR'S OCCUPATION (NUMBER)				
FARMING	151	N/A	N/A	N/A
NON-FARMING	188	N/A	N/A	N/A
GOVERNMENT PAYMENT PROGRAM PARTICIPATION				
NUMBER OF FARMS	16	N/A	N/A	N/A
PERCENT OF TOTAL	4.72%	N/A	N/A	N/A
TOTAL PAYMENTS RECEIVED ($1,000)	37	7	N/A	N/A
AVERAGE PAYMENT RECEIVED PER FARM ($)	2,344	438	N/A	N/A

1/AREA COUNTED ONLY ONCE (ALL HAY, ALFALFA, SMALL GRAIN, GRASS SILAGE, GREENCHOP).
N - REPRESENTS ZERO.
0 - REPRESENTS AN INSIGNIFICANT AMOUNT.
D - WITHHELD TO AVOID DISCLOSING DATA FOR INDIVIDUAL FARMS.
Z - LESS THAN HALF OF THE UNIT SHOWN

SOURCE: USDA, NASS, 2002 CENSUS OF AGRICULTURE.

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# ---------------------------------- WARNING ----------------------------------------
# The data you have obtained from this automated U.S. Geological Survey database
# have not received Director's approval and as such are provisional and subject to
# revision.  The data are released on the condition that neither the USGS nor the
# United States Government may be held liable for any damages resulting from its use.
# Additional info: http://waterdata.usgs.gov/nwis/help/?provisional
#
# File-format description:  http://waterdata.usgs.gov/nwis/?tab_delimited_format_info
# Automated-retrieval info: http://waterdata.usgs.gov/nwis/?automated_retrieval_info
#
# Contact:   gs-w_support_nwisweb@usgs.gov
# retrieved: 2008-05-12 10:14:32 EDT
#
# Data for the following site(s) are contained in this file
#    USGS 08091730 Squaw Ck Res nr Glen Rose, TX
# -----------------------------------------------------------------------------------
#
# Data provided for site 08091730
#    DD parameter statistic   Description
#    03   72020     00001     Elevation above NGVD 1929, feet (Maximum)
#    03   72020     00002     Elevation above NGVD 1929, feet (Minimum)
#    03   72020     00003     Elevation above NGVD 1929, feet (Mean)
#
# Data-value qualification codes included in this output:
#     A  Approved for publication -- Processing and review completed.
#
```

agency_cd	site_no	datetime	03_72020_00001		03_72020_00001_cd		03_72020_00002		03_72020_00002_cd		03_72020_00003		03_7
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USGS	08091730	2001-02-07	775.29	A	775.25	A	775.27	A
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USGS	08091730	2001-04-05	775.18	A	775.17	A	775.17	A
USGS	08091730	2001-04-06	775.20	A	775.15	A	775.18	A
USGS	08091730	2001-04-07	775.18	A	775.16	A	775.17	A
USGS	08091730	2001-04-08	775.18	A	775.14	A	775.16	A
USGS	08091730	2001-04-09	775.16	A	775.14	A	775.15	A
USGS	08091730	2001-04-10	775.16	A	775.10	A	775.13	A
USGS	08091730	2001-04-11	775.23	A	775.10	A	775.20	A
USGS	08091730	2001-04-12	775.22	A	775.20	A	775.21	A
USGS	08091730	2001-04-13	775.21	A	775.18	A	775.20	A
USGS	08091730	2001-04-14	775.20	A	775.18	A	775.19	A
USGS	08091730	2001-04-15	775.20	A	775.17	A	775.18	A
USGS	08091730	2001-04-16	775.17	A	775.15	A	775.16	A
USGS	08091730	2001-04-17	775.17	A	775.07	A	775.11	A
USGS	08091730	2001-04-18	775.08	A	775.04	A	775.07	A
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USGS	08091730	2001-04-20	775.03	A	774.99	A	775.01	A
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USGS	08091730	2001-04-25	774.89	A	774.87	A	774.88	A
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USGS	08091730	2001-05-03	774.66	A	774.63	A	774.65	A
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USGS	08091730	2001-05-24	774.96	A	774.92	A	774.94	A
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USGS	08091730	2001-06-10	775.18	A	775.14	A	775.16	A
USGS	08091730	2001-06-11	775.20	A	775.17	A	775.18	A
USGS	08091730	2001-06-12	775.21	A	775.18	A	775.19	A
USGS	08091730	2001-06-13	775.20	A	775.15	A	775.18	A
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USGS	08091730	2001-06-28	775.30	A	775.28	A	775.28	A
USGS	08091730	2001-06-29	775.29	A	775.27	A	775.28	A

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USGS	08091730	2001-07-02	775.38	A	775.36	A	775.37	A
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USGS	08091730	2001-07-04	775.38	A	775.36	A	775.37	A
USGS	08091730	2001-07-05	775.38	A	775.36	A	775.37	A
USGS	08091730	2001-07-06	775.38	A	775.36	A	775.37	A
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USGS	08091730	2001-07-12	775.33	A	775.30	A	775.32	A
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USGS	08091730	2001-07-26	775.23	A	775.21	A	775.21	A
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USGS	08091730	2001-08-01	775.18	A	775.17	A	775.17	A
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USGS	08091730	2001-08-03	775.19	A	775.17	A	775.18	A
USGS	08091730	2001-08-04	775.20	A	775.18	A	775.19	A
USGS	08091730	2001-08-05	775.22	A	775.20	A	775.21	A
USGS	08091730	2001-08-06	775.22	A	775.20	A	775.21	A
USGS	08091730	2001-08-07	775.22	A	775.20	A	775.21	A
USGS	08091730	2001-08-08	775.22	A	775.20	A	775.21	A
USGS	08091730	2001-08-09	775.20	A	775.19	A	775.20	A
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USGS	08091730	2001-08-11	775.20	A	775.19	A	775.19	A
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USGS	08091730	2001-08-14	775.21	A	775.20	A	775.20	A
USGS	08091730	2001-08-15	775.21	A	775.20	A	775.20	A
USGS	08091730	2001-08-16	775.24	A	775.20	A	775.23	A
USGS	08091730	2001-08-17	775.33	A	775.24	A	775.30	A
USGS	08091730	2001-08-18	775.33	A	775.32	A	775.32	A
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USGS	08091730	2001-08-20	775.33	A	775.32	A	775.33	A
USGS	08091730	2001-08-21	775.32	A	775.30	A	775.31	A
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USGS	08091730	2001-09-01	775.43	A	775.42	A	775.42	A
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USGS	08091730	2001-09-05	775.44	A	775.44	A	775.44	A
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USGS	08091730	2001-09-07	775.42	A	775.38	A	775.40	A
USGS	08091730	2001-09-08	775.39	A	775.37	A	775.38	A
USGS	08091730	2001-09-09	775.40	A	775.37	A	775.38	A
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USGS	08091730	2001-09-17	775.37	A	775.36	A	775.37	A
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USGS	08091730	2001-09-21	775.38	A	775.36	A	775.37	A
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USGS	08091730	2001-09-25	775.32	A	775.31	A	775.32	A
USGS	08091730	2001-09-26	775.32	A	775.31	A	775.31	A
USGS	08091730	2001-09-27	775.32	A	775.31	A	775.31	A
USGS	08091730	2001-09-28	775.32	A	775.31	A	775.31	A
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USGS	08091730	2001-11-01	775.26	A	775.26	A	775.26	A
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USGS	08091730	2001-11-03	775.28	A	775.26	A	775.27	A
USGS	08091730	2001-11-04	775.30	A	775.28	A	775.29	A
USGS	08091730	2001-11-05	775.30	A	775.29	A	775.30	A
USGS	08091730	2001-11-06	775.31	A	775.30	A	775.30	A
USGS	08091730	2001-11-07	775.30	A	775.29	A	775.30	A
USGS	08091730	2001-11-08	775.30	A	775.29	A	775.29	A
USGS	08091730	2001-11-09	775.29	A	775.27	A	775.28	A
USGS	08091730	2001-11-10	775.29	A	775.28	A	775.28	A
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USGS	08091730	2001-11-24	775.33	A	775.29	A	775.30	A
USGS	08091730	2001-11-25	775.30	A	775.28	A	775.29	A
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USGS	08091730	2002-05-06	775.41	A	775.39	A	775.40	A
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USGS	08091730	2002-09-01	775.24	A	775.17	A	775.19	A
USGS	08091730	2002-09-02	775.21	A	775.18	A	775.20	A
USGS	08091730	2002-09-03	775.23	A	775.16	A	775.20	A
USGS	08091730	2002-09-04	775.24	A	775.17	A	775.20	A
USGS	08091730	2002-09-05	775.24	A	775.17	A	775.21	A
USGS	08091730	2002-09-06	775.30	A	775.16	A	775.22	A
USGS	08091730	2002-09-07	775.31	A	775.12	A	775.22	A
USGS	08091730	2002-09-08	775.32	A	775.13	A	775.23	A
USGS	08091730	2002-09-09	775.37	A	775.17	A	775.26	A
USGS	08091730	2002-09-10	775.31	A	775.22	A	775.27	A
USGS	08091730	2002-09-11	775.30	A	775.24	A	775.27	A
USGS	08091730	2002-09-12	775.31	A	775.27	A	775.29	A
USGS	08091730	2002-09-13	775.32	A	775.28	A	775.29	A
USGS	08091730	2002-09-14	775.42	A	775.23	A	775.29	A
USGS	08091730	2002-09-15	775.36	A	775.18	A	775.27	A
USGS	08091730	2002-09-16	775.29	A	775.24	A	775.26	A
USGS	08091730	2002-09-17	775.27	A	775.25	A	775.26	A
USGS	08091730	2002-09-18	775.28	A	775.20	A	775.24	A
USGS	08091730	2002-09-19	775.46	A	774.99	A	775.24	A
USGS	08091730	2002-09-20	775.29	A	775.09	A	775.18	A
USGS	08091730	2002-09-21	775.15	A	775.10	A	775.13	A
USGS	08091730	2002-09-22	775.41	A	774.96	A	775.14	A
USGS	08091730	2002-09-23	775.24	A	775.05	A	775.11	A
USGS	08091730	2002-09-24	775.21	A	775.05	A	775.11	A
USGS	08091730	2002-09-25	775.22	A	775.02	A	775.10	A
USGS	08091730	2002-09-26	775.21	A	774.96	A	775.10	A
USGS	08091730	2002-09-27	775.14	A	775.11	A	775.12	A
USGS	08091730	2002-09-28	775.17	A	775.11	A	775.14	A
USGS	08091730	2002-09-29	775.18	A	775.14	A	775.15	A
USGS	08091730	2002-09-30	775.18	A	775.14	A	775.16	A
USGS	08091730	2002-10-01	775.19	A	775.15	A	775.17	A
USGS	08091730	2002-10-02	775.20	A	775.15	A	775.18	A
USGS	08091730	2002-10-03	775.21	A	775.18	A	775.20	A
USGS	08091730	2002-10-04	775.37	A	775.01	A	775.21	A
USGS	08091730	2002-10-05	775.29	A	775.16	A	775.20	A
USGS	08091730	2002-10-06	775.23	A	775.18	A	775.22	A
USGS	08091730	2002-10-07	775.30	A	775.08	A	775.23	A
USGS	08091730	2002-10-08	775.31	A	775.19	A	775.25	A
USGS	08091730	2002-10-09	775.44	A	775.22	A	775.35	A
USGS	08091730	2002-10-10	775.45	A	775.28	A	775.34	A
USGS	08091730	2002-10-11	775.33	A	775.31	A	775.32	A
USGS	08091730	2002-10-12	775.31	A	775.29	A	775.30	A
USGS	08091730	2002-10-13	775.30	A	775.24	A	775.27	A
USGS	08091730	2002-10-14	775.24	A	775.19	A	775.22	A
USGS	08091730	2002-10-15	775.19	A	775.14	A	775.16	A
USGS	08091730	2002-10-16	775.52	A	775.12	A	775.38	A
USGS	08091730	2002-10-17	775.49	A	775.44	A	775.47	A
USGS	08091730	2002-10-18	775.44	A	775.40	A	775.42	A
USGS	08091730	2002-10-19	775.40	A	775.35	A	775.38	A
USGS	08091730	2002-10-20	775.35	A	775.31	A	775.33	A
USGS	08091730	2002-10-21	775.46	A	775.29	A	775.38	A
USGS	08091730	2002-10-22	775.40	A	775.31	A	775.35	A
USGS	08091730	2002-10-23	775.31	A	775.17	A	775.26	A
USGS	08091730	2002-10-24	775.40	A	775.20	A	775.30	A
USGS	08091730	2002-10-25	775.47	A	775.40	A	775.44	A
USGS	08091730	2002-10-26	775.47	A	775.45	A	775.46	A
USGS	08091730	2002-10-27	775.47	A	775.46	A	775.46	A
USGS	08091730	2002-10-28	775.47	A	775.45	A	775.46	A
USGS	08091730	2002-10-29	775.48	A	775.46	A	775.47	A
USGS	08091730	2002-10-30	775.49	A	775.44	A	775.47	A
USGS	08091730	2002-10-31	775.51	A	775.48	A	775.49	A
USGS	08091730	2002-11-01	775.51	A	775.48	A	775.50	A
USGS	08091730	2002-11-02	775.49	A	775.46	A	775.48	A
USGS	08091730	2002-11-03	775.48	A	775.45	A	775.47	A
USGS	08091730	2002-11-04	775.49	A	775.47	A	775.48	A
USGS	08091730	2002-11-05	775.52	A	775.46	A	775.49	A
USGS	08091730	2002-11-06	775.52	A	775.49	A	775.50	A
USGS	08091730	2002-11-07	775.51	A	775.48	A	775.50	A
USGS	08091730	2002-11-08	775.52	A	775.48	A	775.50	A
USGS	08091730	2002-11-09	775.54	A	775.48	A	775.51	A
USGS	08091730	2002-11-10	775.54	A	775.50	A	775.51	A
USGS	08091730	2002-11-11	775.52	A	775.50	A	775.51	A

USGS	08091730	2002-11-12	775.53	A	775.50	A	775.51	A
USGS	08091730	2002-11-13	775.52	A	775.39	A	775.44	A
USGS	08091730	2002-11-14	775.42	A	775.37	A	775.40	A
USGS	08091730	2002-11-15	775.42	A	775.39	A	775.40	A
USGS	08091730	2002-11-16	775.42	A	775.41	A	775.41	A
USGS	08091730	2002-11-17	775.42	A	775.39	A	775.41	A
USGS	08091730	2002-11-18	775.42	A	775.39	A	775.41	A
USGS	08091730	2002-11-19	775.41	A	775.39	A	775.40	A
USGS	08091730	2002-11-20	775.40	A	775.38	A	775.39	A
USGS	08091730	2002-11-21	775.40	A	775.39	A	775.39	A
USGS	08091730	2002-11-22	775.40	A	775.38	A	775.39	A
USGS	08091730	2002-11-23	775.39	A	775.38	A	775.39	A
USGS	08091730	2002-11-24	775.40	A	775.37	A	775.38	A
USGS	08091730	2002-11-25	775.41	A	775.36	A	775.39	A
USGS	08091730	2002-11-26	775.42	A	775.38	A	775.40	A
USGS	08091730	2002-11-27	775.43	A	775.41	A	775.42	A
USGS	08091730	2002-11-28	775.43	A	775.41	A	775.42	A
USGS	08091730	2002-11-29	775.42	A	775.40	A	775.41	A
USGS	08091730	2002-11-30	775.42	A	775.38	A	775.41	A
USGS	08091730	2002-12-01	775.43	A	775.41	A	775.42	A
USGS	08091730	2002-12-02	775.43	A	775.40	A	775.41	A
USGS	08091730	2002-12-03	775.41	A	775.31	A	775.36	A
USGS	08091730	2002-12-04	775.37	A	775.31	A	775.34	A
USGS	08091730	2002-12-05	775.39	A	775.35	A	775.37	A
USGS	08091730	2002-12-06	775.44	A	775.38	A	775.42	A
USGS	08091730	2002-12-07	775.43	A	775.41	A	775.42	A
USGS	08091730	2002-12-08	775.43	A	775.36	A	775.41	A
USGS	08091730	2002-12-09	775.36	A	775.26	A	775.28	A
USGS	08091730	2002-12-10	775.28	A	775.25	A	775.27	A
USGS	08091730	2002-12-11	775.30	A	775.27	A	775.28	A
USGS	08091730	2002-12-12	775.31	A	775.29	A	775.30	A
USGS	08091730	2002-12-13	775.35	A	775.30	A	775.33	A
USGS	08091730	2002-12-14	775.35	A	775.33	A	775.34	A
USGS	08091730	2002-12-15	775.35	A	775.31	A	775.33	A
USGS	08091730	2002-12-16	775.35	A	775.31	A	775.34	A
USGS	08091730	2002-12-17	775.36	A	775.32	A	775.34	A
USGS	08091730	2002-12-18	775.36	A	775.32	A	775.34	A
USGS	08091730	2002-12-19	775.39	A	775.34	A	775.37	A
USGS	08091730	2002-12-20	775.39	A	775.38	A	775.38	A
USGS	08091730	2002-12-21	775.41	A	775.36	A	775.39	A
USGS	08091730	2002-12-22	775.42	A	775.40	A	775.41	A
USGS	08091730	2002-12-23	775.42	A	775.33	A	775.37	A
USGS	08091730	2002-12-24	775.40	A	775.34	A	775.38	A
USGS	08091730	2002-12-25	775.40	A	775.39	A	775.39	A
USGS	08091730	2002-12-26	775.40	A	775.38	A	775.39	A
USGS	08091730	2002-12-27	775.40	A	775.39	A	775.39	A
USGS	08091730	2002-12-28	775.39	A	775.37	A	775.39	A
USGS	08091730	2002-12-29	775.41	A	775.35	A	775.38	A
USGS	08091730	2002-12-30	775.40	A	775.33	A	775.36	A
USGS	08091730	2002-12-31	775.39	A	775.34	A	775.37	A
USGS	08091730	2003-01-01	775.44	A	775.36	A	775.39	A
USGS	08091730	2003-01-02	775.44	A	775.36	A	775.42	A
USGS	08091730	2003-01-03	775.43	A	775.41	A	775.42	A
USGS	08091730	2003-01-04	775.42	A	775.39	A	775.41	A
USGS	08091730	2003-01-05	775.41	A	775.39	A	775.40	A
USGS	08091730	2003-01-06	775.41	A	775.38	A	775.40	A
USGS	08091730	2003-01-07	775.42	A	775.40	A	775.41	A
USGS	08091730	2003-01-08	775.41	A	775.39	A	775.40	A
USGS	08091730	2003-01-09	775.45	A	775.37	A	775.41	A
USGS	08091730	2003-01-10	775.43	A	775.41	A	775.43	A
USGS	08091730	2003-01-11	775.44	A	775.43	A	775.43	A
USGS	08091730	2003-01-12	775.44	A	775.38	A	775.41	A
USGS	08091730	2003-01-13	775.40	A	775.38	A	775.39	A
USGS	08091730	2003-01-14	775.39	A	775.38	A	775.38	A
USGS	08091730	2003-01-15	775.42	A	775.35	A	775.38	A
USGS	08091730	2003-01-16	775.42	A	775.30	A	775.36	A
USGS	08091730	2003-01-17	775.37	A	775.32	A	775.34	A
USGS	08091730	2003-01-18	775.32	A	775.26	A	775.29	A
USGS	08091730	2003-01-19	775.27	A	775.21	A	775.24	A
USGS	08091730	2003-01-20	775.22	A	775.15	A	775.18	A
USGS	08091730	2003-01-21	775.16	A	775.11	A	775.13	A
USGS	08091730	2003-01-22	775.12	A	775.06	A	775.09	A
USGS	08091730	2003-01-23	775.10	A	775.06	A	775.08	A
USGS	08091730	2003-01-24	775.08	A	775.04	A	775.06	A
USGS	08091730	2003-01-25	775.07	A	775.05	A	775.06	A
USGS	08091730	2003-01-26	775.07	A	775.03	A	775.05	A
USGS	08091730	2003-01-27	775.06	A	775.03	A	775.05	A
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USGS	08091730	2003-01-29	775.04	A	775.00	A	775.02	A
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USGS	08091730	2003-01-31	775.01	A	774.98	A	774.99	A
USGS	08091730	2003-02-01	774.99	A	774.96	A	774.97	A
USGS	08091730	2003-02-02	774.98	A	774.92	A	774.95	A
USGS	08091730	2003-02-03	774.96	A	774.89	A	774.94	A
USGS	08091730	2003-02-04	774.96	A	774.93	A	774.94	A
USGS	08091730	2003-02-05	775.01	A	774.92	A	774.96	A
USGS	08091730	2003-02-06	775.02	A	774.98	A	775.00	A
USGS	08091730	2003-02-07	775.01	A	774.93	A	774.96	A
USGS	08091730	2003-02-08	774.94	A	774.90	A	774.91	A
USGS	08091730	2003-02-09	774.91	A	774.88	A	774.89	A
USGS	08091730	2003-02-10	774.91	A	774.86	A	774.88	A
USGS	08091730	2003-02-11	774.87	A	774.84	A	774.86	A
USGS	08091730	2003-02-12	774.85	A	774.82	A	774.84	A
USGS	08091730	2003-02-13	774.83	A	774.82	A	774.82	A
USGS	08091730	2003-02-14	774.86	A	774.82	A	774.84	A
USGS	08091730	2003-02-15	774.86	A	774.77	A	774.83	A
USGS	08091730	2003-02-16	774.81	A	774.73	A	774.75	A
USGS	08091730	2003-02-17	774.73	A	774.70	A	774.72	A
USGS	08091730	2003-02-18	774.71	A	774.67	A	774.70	A
USGS	08091730	2003-02-19	774.71	A	774.64	A	774.67	A

USGS	08091730	2003-02-20	774.73	A	774.64	A	774.68	A
USGS	08091730	2003-02-21	774.98	A	774.72	A	774.80	A
USGS	08091730	2003-02-22	775.03	A	774.95	A	775.00	A
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USGS	08091730	2003-02-26	774.96	A	774.92	A	774.94	A
USGS	08091730	2003-02-27	774.94	A	774.91	A	774.93	A
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USGS	08091730	2003-03-01	774.92	A	774.90	A	774.91	A
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USGS	08091730	2003-03-05	774.91	A	774.85	A	774.88	A
USGS	08091730	2003-03-06	774.86	A	774.82	A	774.84	A
USGS	08091730	2003-03-07	774.84	A	774.82	A	774.83	A
USGS	08091730	2003-03-08	774.83	A	774.79	A	774.81	A
USGS	08091730	2003-03-09	774.82	A	774.78	A	774.79	A
USGS	08091730	2003-03-10	774.78	A	774.75	A	774.77	A
USGS	08091730	2003-03-11	774.76	A	774.73	A	774.75	A
USGS	08091730	2003-03-12	774.74	A	774.72	A	774.73	A
USGS	08091730	2003-03-13	774.74	A	774.71	A	774.72	A
USGS	08091730	2003-03-14	774.71	A	774.69	A	774.70	A
USGS	08091730	2003-03-15	774.70	A	774.67	A	774.69	A
USGS	08091730	2003-03-16	774.68	A	774.65	A	774.66	A
USGS	08091730	2003-03-17	774.66	A	774.62	A	774.64	A
USGS	08091730	2003-03-18	774.69	A	774.62	A	774.66	A
USGS	08091730	2003-03-19	774.68	A	774.61	A	774.64	A
USGS	08091730	2003-03-20	774.62	A	774.56	A	774.59	A
USGS	08091730	2003-03-21	774.57	A	774.54	A	774.55	A
USGS	08091730	2003-03-22	774.56	A	774.53	A	774.55	A
USGS	08091730	2003-03-23	774.56	A	774.53	A	774.55	A
USGS	08091730	2003-03-24	774.55	A	774.51	A	774.52	A
USGS	08091730	2003-03-25	774.52	A	774.48	A	774.50	A
USGS	08091730	2003-03-26	774.50	A	774.45	A	774.47	A
USGS	08091730	2003-03-27	774.45	A	774.38	A	774.43	A
USGS	08091730	2003-03-28	774.45	A	774.34	A	774.38	A
USGS	08091730	2003-03-29	774.35	A	774.28	A	774.32	A
USGS	08091730	2003-03-30	774.28	A	774.25	A	774.27	A
USGS	08091730	2003-03-31	774.26	A	774.21	A	774.24	A
USGS	08091730	2003-04-01	774.22	A	774.18	A	774.20	A
USGS	08091730	2003-04-02	774.20	A	774.14	A	774.17	A
USGS	08091730	2003-04-03	774.16	A	774.12	A	774.14	A
USGS	08091730	2003-04-04	774.22	A	774.14	A	774.19	A
USGS	08091730	2003-04-05	774.25	A	774.22	A	774.23	A
USGS	08091730	2003-04-06	774.29	A	774.24	A	774.27	A
USGS	08091730	2003-04-07	774.32	A	774.25	A	774.29	A
USGS	08091730	2003-04-08	774.34	A	774.21	A	774.27	A
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USGS	08091730	2003-04-10	774.35	A	774.29	A	774.33	A
USGS	08091730	2003-04-11	774.39	A	774.34	A	774.36	A
USGS	08091730	2003-04-12	774.42	A	774.37	A	774.40	A
USGS	08091730	2003-04-13	774.45	A	774.41	A	774.43	A
USGS	08091730	2003-04-14	774.48	A	774.43	A	774.46	A
USGS	08091730	2003-04-15	774.51	A	774.46	A	774.47	A
USGS	08091730	2003-04-16	774.51	A	774.47	A	774.49	A
USGS	08091730	2003-04-17	774.54	A	774.50	A	774.52	A
USGS	08091730	2003-04-18	774.58	A	774.53	A	774.55	A
USGS	08091730	2003-04-19	774.60	A	774.54	A	774.58	A
USGS	08091730	2003-04-20	774.62	A	774.58	A	774.60	A
USGS	08091730	2003-04-21	774.63	A	774.60	A	774.62	A
USGS	08091730	2003-04-22	774.68	A	774.63	A	774.65	A
USGS	08091730	2003-04-23	774.86	A	774.67	A	774.71	A
USGS	08091730	2003-04-24	774.85	A	774.81	A	774.83	A
USGS	08091730	2003-04-25	774.86	A	774.83	A	774.85	A
USGS	08091730	2003-04-26	774.88	A	774.86	A	774.87	A
USGS	08091730	2003-04-27	774.92	A	774.88	A	774.89	A
USGS	08091730	2003-04-28	774.94	A	774.89	A	774.93	A
USGS	08091730	2003-04-29	774.98	A	774.94	A	774.96	A
USGS	08091730	2003-04-30	775.01	A	774.96	A	774.99	A
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USGS	08091730	2003-05-02	775.11	A	775.04	A	775.06	A
USGS	08091730	2003-05-03	775.16	A	775.10	A	775.14	A
USGS	08091730	2003-05-04	775.19	A	775.15	A	775.17	A
USGS	08091730	2003-05-05	775.23	A	775.18	A	775.21	A
USGS	08091730	2003-05-06	775.27	A	775.21	A	775.24	A
USGS	08091730	2003-05-07	775.29	A	775.26	A	775.28	A
USGS	08091730	2003-05-08	775.30	A	775.27	A	775.29	A
USGS	08091730	2003-05-09	775.31	A	775.28	A	775.29	A
USGS	08091730	2003-05-10	775.32	A	775.29	A	775.30	A
USGS	08091730	2003-05-11	775.34	A	775.28	A	775.30	A
USGS	08091730	2003-05-12	775.30	A	775.28	A	775.29	A
USGS	08091730	2003-05-13	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-05-14	775.34	A	775.30	A	775.32	A
USGS	08091730	2003-05-15	775.34	A	775.30	A	775.32	A
USGS	08091730	2003-05-16	775.31	A	775.23	A	775.27	A
USGS	08091730	2003-05-17	775.24	A	775.19	A	775.21	A
USGS	08091730	2003-05-18	775.19	A	775.16	A	775.18	A
USGS	08091730	2003-05-19	775.16	A	775.06	A	775.14	A
USGS	08091730	2003-05-20	775.12	A	775.05	A	775.08	A
USGS	08091730	2003-05-21	775.09	A	775.05	A	775.07	A
USGS	08091730	2003-05-22	775.13	A	775.09	A	775.11	A
USGS	08091730	2003-05-23	775.17	A	775.13	A	775.15	A
USGS	08091730	2003-05-24	775.22	A	775.17	A	775.20	A
USGS	08091730	2003-05-25	775.25	A	775.21	A	775.23	A
USGS	08091730	2003-05-26	775.31	A	775.24	A	775.28	A
USGS	08091730	2003-05-27	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-05-28	775.34	A	775.32	A	775.33	A
USGS	08091730	2003-05-29	775.36	A	775.34	A	775.35	A
USGS	08091730	2003-05-30	775.36	A	775.35	A	775.36	A

USGS	08091730	2003-05-31	775.38	A	775.34	A	775.36	A
USGS	08091730	2003-06-01	775.37	A	775.35	A	775.35	A
USGS	08091730	2003-06-02	775.37	A	775.33	A	775.34	A
USGS	08091730	2003-06-03	775.35	A	775.33	A	775.34	A
USGS	08091730	2003-06-04	775.52	A	775.32	A	775.47	A
USGS	08091730	2003-06-05	775.59	A	775.45	A	775.53	A
USGS	08091730	2003-06-06	775.64	A	775.54	A	775.61	A
USGS	08091730	2003-06-07	775.60	A	775.57	A	775.59	A
USGS	08091730	2003-06-08	775.67	A	775.56	A	775.59	A
USGS	08091730	2003-06-09	775.57	A	775.51	A	775.53	A
USGS	08091730	2003-06-10	775.51	A	775.48	A	775.50	A
USGS	08091730	2003-06-11	775.50	A	775.42	A	775.47	A
USGS	08091730	2003-06-12	775.49	A	775.43	A	775.45	A
USGS	08091730	2003-06-13	775.50	A	775.41	A	775.45	A
USGS	08091730	2003-06-14	775.50	A	775.47	A	775.49	A
USGS	08091730	2003-06-15	775.51	A	775.47	A	775.49	A
USGS	08091730	2003-06-16	775.48	A	775.46	A	775.48	A
USGS	08091730	2003-06-17	775.46	A	775.44	A	775.46	A
USGS	08091730	2003-06-18	775.45	A	775.43	A	775.44	A
USGS	08091730	2003-06-19	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-06-20	775.43	A	775.41	A	775.42	A
USGS	08091730	2003-06-21	775.41	A	775.40	A	775.41	A
USGS	08091730	2003-06-22	775.40	A	775.37	A	775.39	A
USGS	08091730	2003-06-23	775.38	A	775.35	A	775.37	A
USGS	08091730	2003-06-24	775.36	A	775.33	A	775.35	A
USGS	08091730	2003-06-25	775.35	A	775.32	A	775.33	A
USGS	08091730	2003-06-26	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-06-27	775.32	A	775.31	A	775.31	A
USGS	08091730	2003-06-28	775.32	A	775.30	A	775.31	A
USGS	08091730	2003-06-29	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-06-30	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-07-01	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-07-02	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-07-03	775.31	A	775.29	A	775.30	A
USGS	08091730	2003-07-04	775.30	A	775.29	A	775.29	A
USGS	08091730	2003-07-05	775.29	A	775.27	A	775.28	A
USGS	08091730	2003-07-06	775.28	A	775.26	A	775.27	A
USGS	08091730	2003-07-07	775.27	A	775.25	A	775.26	A
USGS	08091730	2003-07-08	775.26	A	775.24	A	775.25	A
USGS	08091730	2003-07-09	775.26	A	775.23	A	775.24	A
USGS	08091730	2003-07-10	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-11	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-07-12	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-07-13	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-07-14	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-15	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-16	775.23	A	775.21	A	775.22	A
USGS	08091730	2003-07-17	775.23	A	775.21	A	775.22	A
USGS	08091730	2003-07-18	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-19	775.25	A	775.22	A	775.24	A
USGS	08091730	2003-07-20	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-07-21	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-22	775.24	A	775.22	A	775.23	A
USGS	08091730	2003-07-23	775.25	A	775.22	A	775.23	A
USGS	08091730	2003-07-24	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-07-25	775.26	A	775.23	A	775.25	A
USGS	08091730	2003-07-26	775.27	A	775.24	A	775.25	A
USGS	08091730	2003-07-27	775.27	A	775.24	A	775.26	A
USGS	08091730	2003-07-28	775.27	A	775.26	A	775.26	A
USGS	08091730	2003-07-29	775.29	A	775.26	A	775.28	A
USGS	08091730	2003-07-30	775.32	A	775.28	A	775.29	A
USGS	08091730	2003-07-31	775.34	A	775.31	A	775.32	A
USGS	08091730	2003-08-01	775.34	A	775.32	A	775.33	A
USGS	08091730	2003-08-02	775.34	A	775.32	A	775.33	A
USGS	08091730	2003-08-03	775.33	A	775.32	A	775.33	A
USGS	08091730	2003-08-04	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-08-05	775.32	A	775.30	A	775.31	A
USGS	08091730	2003-08-06	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-08-07	775.34	A	775.32	A	775.33	A
USGS	08091730	2003-08-08	775.35	A	775.33	A	775.34	A
USGS	08091730	2003-08-09	775.43	A	775.32	A	775.38	A
USGS	08091730	2003-08-10	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-08-11	775.51	A	775.41	A	775.43	A
USGS	08091730	2003-08-12	775.53	A	775.42	A	775.48	A
USGS	08091730	2003-08-13	775.53	A	775.49	A	775.52	A
USGS	08091730	2003-08-14	775.52	A	775.49	A	775.51	A
USGS	08091730	2003-08-15	775.50	A	775.49	A	775.50	A
USGS	08091730	2003-08-16	775.50	A	775.48	A	775.49	A
USGS	08091730	2003-08-17	775.49	A	775.48	A	775.49	A
USGS	08091730	2003-08-18	775.49	A	775.47	A	775.48	A
USGS	08091730	2003-08-19	775.48	A	775.45	A	775.47	A
USGS	08091730	2003-08-20	775.46	A	775.43	A	775.45	A
USGS	08091730	2003-08-21	775.45	A	775.43	A	775.44	A
USGS	08091730	2003-08-22	775.45	A	775.42	A	775.43	A
USGS	08091730	2003-08-23	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-08-24	775.45	A	775.43	A	775.44	A
USGS	08091730	2003-08-25	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-08-26	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-08-27	775.45	A	775.42	A	775.44	A
USGS	08091730	2003-08-28	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-08-29	775.42	A	775.39	A	775.41	A
USGS	08091730	2003-08-30	775.41	A	775.39	A	775.40	A
USGS	08091730	2003-08-31	775.45	A	775.40	A	775.41	A
USGS	08091730	2003-09-01	775.45	A	775.40	A	775.42	A
USGS	08091730	2003-09-02	775.41	A	775.39	A	775.40	A
USGS	08091730	2003-09-03	775.41	A	775.39	A	775.40	A
USGS	08091730	2003-09-04	775.40	A	775.39	A	775.40	A
USGS	08091730	2003-09-05	775.40	A	775.38	A	775.39	A
USGS	08091730	2003-09-06	775.39	A	775.37	A	775.38	A
USGS	08091730	2003-09-07	775.38	A	775.36	A	775.37	A

USGS	08091730	2003-09-08	775.36	A	775.34	A	775.36	A
USGS	08091730	2003-09-09	775.35	A	775.33	A	775.34	A
USGS	08091730	2003-09-10	775.34	A	775.31	A	775.33	A
USGS	08091730	2003-09-11	775.38	A	775.30	A	775.33	A
USGS	08091730	2003-09-12	775.38	A	775.36	A	775.37	A
USGS	08091730	2003-09-13	775.36	A	775.35	A	775.36	A
USGS	08091730	2003-09-14	775.42	A	775.33	A	775.38	A
USGS	08091730	2003-09-15	775.39	A	775.38	A	775.38	A
USGS	08091730	2003-09-16	775.39	A	775.36	A	775.38	A
USGS	08091730	2003-09-17	775.37	A	775.34	A	775.35	A
USGS	08091730	2003-09-18	775.76	A	775.33	A	775.38	A
USGS	08091730	2003-09-19	776.03	A	775.76	A	775.99	A
USGS	08091730	2003-09-20	775.96	A	775.85	A	775.91	A
USGS	08091730	2003-09-21	775.85	A	775.76	A	775.81	A
USGS	08091730	2003-09-22	775.76	A	775.68	A	775.72	A
USGS	08091730	2003-09-23	775.68	A	775.62	A	775.65	A
USGS	08091730	2003-09-24	775.62	A	775.55	A	775.59	A
USGS	08091730	2003-09-25	775.56	A	775.51	A	775.53	A
USGS	08091730	2003-09-26	775.52	A	775.48	A	775.50	A
USGS	08091730	2003-09-27	775.49	A	775.44	A	775.47	A
USGS	08091730	2003-09-28	775.44	A	775.39	A	775.42	A
USGS	08091730	2003-09-29	775.40	A	775.34	A	775.37	A
USGS	08091730	2003-09-30	775.34	A	775.29	A	775.32	A
USGS	08091730	2003-10-01	775.24	A	775.21	A	775.23	A
USGS	08091730	2003-10-02	775.22	A	775.18	A	775.20	A
USGS	08091730	2003-10-03	775.19	A	775.15	A	775.17	A
USGS	08091730	2003-10-04	775.15	A	775.14	A	775.15	A
USGS	08091730	2003-10-05	775.19	A	775.14	A	775.16	A
USGS	08091730	2003-10-06	775.35	A	775.17	A	775.28	A
USGS	08091730	2003-10-07	775.36	A	775.35	A	775.36	A
USGS	08091730	2003-10-08	775.36	A	775.34	A	775.35	A
USGS	08091730	2003-10-09	775.46	A	775.35	A	775.44	A
USGS	08091730	2003-10-10	775.46	A	775.43	A	775.45	A
USGS	08091730	2003-10-11	775.47	A	775.42	A	775.44	A
USGS	08091730	2003-10-12	775.47	A	775.44	A	775.45	A
USGS	08091730	2003-10-13	775.44	A	775.42	A	775.43	A
USGS	08091730	2003-10-14	775.44	A	775.36	A	775.40	A
USGS	08091730	2003-10-15	775.37	A	775.33	A	775.35	A
USGS	08091730	2003-10-16	775.34	A	775.31	A	775.32	A
USGS	08091730	2003-10-17	775.33	A	775.27	A	775.30	A
USGS	08091730	2003-10-18	775.27	A	775.26	A	775.27	A
USGS	08091730	2003-10-19	775.27	A	775.25	A	775.26	A
USGS	08091730	2003-10-20	775.27	A	775.25	A	775.26	A
USGS	08091730	2003-10-21	775.26	A	775.25	A	775.25	A
USGS	08091730	2003-10-22	775.26	A	775.23	A	775.25	A
USGS	08091730	2003-10-23	775.25	A	775.24	A	775.25	A
USGS	08091730	2003-10-24	775.25	A	775.23	A	775.24	A
USGS	08091730	2003-10-25	775.24	A	775.17	A	775.22	A
USGS	08091730	2003-10-26	775.20	A	775.15	A	775.17	A
USGS	08091730	2003-10-27	775.16	A	775.14	A	775.15	A
USGS	08091730	2003-10-28	775.15	A	775.14	A	775.14	A
USGS	08091730	2003-10-29	775.15	A	775.11	A	775.14	A
USGS	08091730	2003-10-30	775.13	A	775.11	A	775.12	A
USGS	08091730	2003-10-31	775.13	A	775.11	A	775.12	A
USGS	08091730	2003-11-01	775.14	A	775.12	A	775.13	A
USGS	08091730	2003-11-02	775.14	A	775.12	A	775.13	A
USGS	08091730	2003-11-03	775.14	A	775.13	A	775.13	A
USGS	08091730	2003-11-04	775.14	A	775.13	A	775.13	A
USGS	08091730	2003-11-05	775.14	A	775.12	A	775.13	A
USGS	08091730	2003-11-06	775.13	A	775.08	A	775.10	A
USGS	08091730	2003-11-07	775.10	A	775.07	A	775.09	A
USGS	08091730	2003-11-08	775.09	A	775.07	A	775.08	A
USGS	08091730	2003-11-09	775.09	A	775.06	A	775.08	A
USGS	08091730	2003-11-10	775.06	A	775.03	A	775.05	A
USGS	08091730	2003-11-11	775.04	A	775.00	A	775.02	A
USGS	08091730	2003-11-12	775.04	A	774.98	A	775.01	A
USGS	08091730	2003-11-13	775.01	A	774.98	A	774.99	A
USGS	08091730	2003-11-14	775.00	A	774.98	A	774.99	A
USGS	08091730	2003-11-15	775.02	A	774.98	A	775.01	A
USGS	08091730	2003-11-16	775.05	A	775.02	A	775.03	A
USGS	08091730	2003-11-17	775.10	A	775.03	A	775.06	A
USGS	08091730	2003-11-18	775.11	A	775.00	A	775.07	A
USGS	08091730	2003-11-19	775.07	A	775.04	A	775.06	A
USGS	08091730	2003-11-20	775.09	A	775.06	A	775.07	A
USGS	08091730	2003-11-21	775.09	A	775.06	A	775.08	A
USGS	08091730	2003-11-22	775.11	A	775.06	A	775.09	A
USGS	08091730	2003-11-23	775.14	A	775.05	A	775.08	A
USGS	08091730	2003-11-24	775.07	A	775.05	A	775.06	A
USGS	08091730	2003-11-25	775.07	A	775.03	A	775.06	A
USGS	08091730	2003-11-26	775.08	A	775.05	A	775.07	A
USGS	08091730	2003-11-27	775.10	A	775.02	A	775.07	A
USGS	08091730	2003-11-28	775.06	A	775.04	A	775.05	A
USGS	08091730	2003-11-29	775.07	A	775.05	A	775.06	A
USGS	08091730	2003-11-30	775.08	A	775.05	A	775.06	A
USGS	08091730	2003-12-01	775.10	A	775.07	A	775.09	A
USGS	08091730	2003-12-02	775.12	A	775.10	A	775.11	A
USGS	08091730	2003-12-03	775.14	A	775.11	A	775.12	A
USGS	08091730	2003-12-04	775.15	A	775.12	A	775.13	A
USGS	08091730	2003-12-05	775.18	A	775.10	A	775.13	A
USGS	08091730	2003-12-06	775.14	A	775.11	A	775.13	A
USGS	08091730	2003-12-07	775.16	A	775.12	A	775.14	A
USGS	08091730	2003-12-08	775.16	A	775.13	A	775.14	A
USGS	08091730	2003-12-09	775.20	A	775.07	A	775.14	A
USGS	08091730	2003-12-10	775.13	A	775.08	A	775.10	A
USGS	08091730	2003-12-11	775.12	A	775.10	A	775.11	A
USGS	08091730	2003-12-12	775.17	A	775.10	A	775.13	A
USGS	08091730	2003-12-13	775.16	A	775.14	A	775.15	A
USGS	08091730	2003-12-14	775.18	A	775.15	A	775.16	A
USGS	08091730	2003-12-15	775.21	A	775.15	A	775.18	A
USGS	08091730	2003-12-16	775.20	A	775.12	A	775.15	A

USGS	08091730	2003-12-17	775.17	A	775.14	A	775.15	A
USGS	08091730	2003-12-18	775.18	A	775.14	A	775.16	A
USGS	08091730	2003-12-19	775.19	A	775.16	A	775.17	A
USGS	08091730	2003-12-20	775.21	A	775.18	A	775.19	A
USGS	08091730	2003-12-21	775.23	A	775.19	A	775.21	A
USGS	08091730	2003-12-22	775.24	A	775.20	A	775.22	A
USGS	08091730	2003-12-23	775.24	A	775.19	A	775.21	A
USGS	08091730	2003-12-24	775.23	A	775.21	A	775.22	A
USGS	08091730	2003-12-25	775.25	A	775.22	A	775.23	A
USGS	08091730	2003-12-26	775.26	A	775.24	A	775.25	A
USGS	08091730	2003-12-27	775.31	A	775.24	A	775.27	A
USGS	08091730	2003-12-28	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-12-29	775.33	A	775.29	A	775.32	A
USGS	08091730	2003-12-30	775.33	A	775.31	A	775.32	A
USGS	08091730	2003-12-31	775.34	A	775.31	A	775.32	A
USGS	08091730	2004-01-01	775.36	A	775.32	A	775.34	A
USGS	08091730	2004-01-02	775.38	A	775.34	A	775.36	A
USGS	08091730	2004-01-03	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-01-04	775.40	A	775.34	A	775.37	A
USGS	08091730	2004-01-05	775.37	A	775.32	A	775.34	A
USGS	08091730	2004-01-06	775.35	A	775.31	A	775.32	A
USGS	08091730	2004-01-07	775.32	A	775.29	A	775.31	A
USGS	08091730	2004-01-08	775.32	A	775.30	A	775.31	A
USGS	08091730	2004-01-09	775.33	A	775.29	A	775.31	A
USGS	08091730	2004-01-10	775.32	A	775.31	A	775.32	A
USGS	08091730	2004-01-11	775.33	A	775.31	A	775.32	A
USGS	08091730	2004-01-12	775.34	A	775.32	A	775.33	A
USGS	08091730	2004-01-13	775.35	A	775.33	A	775.34	A
USGS	08091730	2004-01-14	775.37	A	775.34	A	775.36	A
USGS	08091730	2004-01-15	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-01-16	775.51	A	775.38	A	775.42	A
USGS	08091730	2004-01-17	775.52	A	775.48	A	775.50	A
USGS	08091730	2004-01-18	775.51	A	775.43	A	775.47	A
USGS	08091730	2004-01-19	775.45	A	775.41	A	775.43	A
USGS	08091730	2004-01-20	775.43	A	775.41	A	775.42	A
USGS	08091730	2004-01-21	775.41	A	775.38	A	775.40	A
USGS	08091730	2004-01-22	775.39	A	775.34	A	775.36	A
USGS	08091730	2004-01-23	775.35	A	775.30	A	775.32	A
USGS	08091730	2004-01-24	775.31	A	775.28	A	775.30	A
USGS	08091730	2004-01-25	775.30	A	775.23	A	775.27	A
USGS	08091730	2004-01-26	775.29	A	775.14	A	775.21	A
USGS	08091730	2004-01-27	775.17	A	775.13	A	775.15	A
USGS	08091730	2004-01-28	775.14	A	775.09	A	775.12	A
USGS	08091730	2004-01-29	775.10	A	775.06	A	775.08	A
USGS	08091730	2004-01-30	775.07	A	775.02	A	775.04	A
USGS	08091730	2004-01-31	775.03	A	774.99	A	775.01	A
USGS	08091730	2004-02-01	775.02	A	774.97	A	774.99	A
USGS	08091730	2004-02-02	775.00	A	774.95	A	774.97	A
USGS	08091730	2004-02-03	774.99	A	774.97	A	774.98	A
USGS	08091730	2004-02-04	775.02	A	774.98	A	775.00	A
USGS	08091730	2004-02-05	775.05	A	774.99	A	775.03	A
USGS	08091730	2004-02-06	775.07	A	775.01	A	775.04	A
USGS	08091730	2004-02-07	775.07	A	775.04	A	775.05	A
USGS	08091730	2004-02-08	775.08	A	775.06	A	775.07	A
USGS	08091730	2004-02-09	775.11	A	775.06	A	775.09	A
USGS	08091730	2004-02-10	775.12	A	775.09	A	775.11	A
USGS	08091730	2004-02-11	775.20	A	775.11	A	775.16	A
USGS	08091730	2004-02-12	775.21	A	775.16	A	775.18	A
USGS	08091730	2004-02-13	775.19	A	775.16	A	775.18	A
USGS	08091730	2004-02-14	775.22	A	775.18	A	775.20	A
USGS	08091730	2004-02-15	775.23	A	775.20	A	775.22	A
USGS	08091730	2004-02-16	775.26	A	775.22	A	775.24	A
USGS	08091730	2004-02-17	775.27	A	775.24	A	775.25	A
USGS	08091730	2004-02-18	775.28	A	775.25	A	775.27	A
USGS	08091730	2004-02-19	775.29	A	775.26	A	775.27	A
USGS	08091730	2004-02-20	775.31	A	775.27	A	775.29	A
USGS	08091730	2004-02-21	775.30	A	775.29	A	775.29	A
USGS	08091730	2004-02-22	775.32	A	775.30	A	775.31	A
USGS	08091730	2004-02-23	775.39	A	775.32	A	775.35	A
USGS	08091730	2004-02-24	775.51	A	775.37	A	775.41	A
USGS	08091730	2004-02-25	775.79	A	775.51	A	775.70	A
USGS	08091730	2004-02-26	775.78	A	775.74	A	775.76	A
USGS	08091730	2004-02-27	775.74	A	775.68	A	775.71	A
USGS	08091730	2004-02-28	775.69	A	775.63	A	775.66	A
USGS	08091730	2004-02-29	775.73	A	775.61	A	775.65	A
USGS	08091730	2004-03-01	775.67	A	775.63	A	775.64	A
USGS	08091730	2004-03-02	775.63	A	775.60	A	775.62	A
USGS	08091730	2004-03-03	775.61	A	775.59	A	775.60	A
USGS	08091730	2004-03-04	775.67	A	775.56	A	775.62	A
USGS	08091730	2004-03-05	775.69	A	775.64	A	775.66	A
USGS	08091730	2004-03-06	775.66	A	775.62	A	775.63	A
USGS	08091730	2004-03-07	775.63	A	775.57	A	775.60	A
USGS	08091730	2004-03-08	775.57	A	775.54	A	775.56	A
USGS	08091730	2004-03-09	775.56	A	775.51	A	775.54	A
USGS	08091730	2004-03-10	775.52	A	775.49	A	775.50	A
USGS	08091730	2004-03-11	775.51	A	775.48	A	775.49	A
USGS	08091730	2004-03-12	775.48	A	775.47	A	775.47	A
USGS	08091730	2004-03-13	775.48	A	775.46	A	775.47	A
USGS	08091730	2004-03-14	775.50	A	775.47	A	775.48	A
USGS	08091730	2004-03-15	775.49	A	775.47	A	775.48	A
USGS	08091730	2004-03-16	775.48	A	775.46	A	775.47	A
USGS	08091730	2004-03-17	775.48	A	775.46	A	775.47	A
USGS	08091730	2004-03-18	775.47	A	775.45	A	775.46	A
USGS	08091730	2004-03-19	775.47	A	775.44	A	775.46	A
USGS	08091730	2004-03-20	775.48	A	775.44	A	775.46	A
USGS	08091730	2004-03-21	775.47	A	775.42	A	775.44	A
USGS	08091730	2004-03-22	775.42	A	775.40	A	775.41	A
USGS	08091730	2004-03-23	775.41	A	775.38	A	775.40	A
USGS	08091730	2004-03-24	775.39	A	775.37	A	775.38	A
USGS	08091730	2004-03-25	775.40	A	775.37	A	775.38	A

USGS	08091730	2004-03-26	775.42	A	775.37	A	775.39	A
USGS	08091730	2004-03-27	775.42	A	775.37	A	775.39	A
USGS	08091730	2004-03-28	775.41	A	775.37	A	775.39	A
USGS	08091730	2004-03-29	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-03-30	775.40	A	775.37	A	775.39	A
USGS	08091730	2004-03-31	775.39	A	775.38	A	775.38	A
USGS	08091730	2004-04-01	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-04-02	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-04-03	775.41	A	775.39	A	775.40	A
USGS	08091730	2004-04-04	775.40	A	775.39	A	775.40	A
USGS	08091730	2004-04-05	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-04-06	775.45	A	775.37	A	775.42	A
USGS	08091730	2004-04-07	775.45	A	775.42	A	775.43	A
USGS	08091730	2004-04-08	775.43	A	775.42	A	775.43	A
USGS	08091730	2004-04-09	775.45	A	775.42	A	775.43	A
USGS	08091730	2004-04-10	775.45	A	775.40	A	775.42	A
USGS	08091730	2004-04-11	775.42	A	775.38	A	775.40	A
USGS	08091730	2004-04-12	775.40	A	775.37	A	775.39	A
USGS	08091730	2004-04-13	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-04-14	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-04-15	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-04-16	775.39	A	775.37	A	775.38	A
USGS	08091730	2004-04-17	775.39	A	775.36	A	775.38	A
USGS	08091730	2004-04-18	775.39	A	775.36	A	775.38	A
USGS	08091730	2004-04-19	775.39	A	775.36	A	775.38	A
USGS	08091730	2004-04-20	775.40	A	775.37	A	775.38	A
USGS	08091730	2004-04-21	775.40	A	775.37	A	775.39	A
USGS	08091730	2004-04-22	775.41	A	775.38	A	775.40	A
USGS	08091730	2004-04-23	775.42	A	775.36	A	775.40	A
USGS	08091730	2004-04-24	775.85	A	775.41	A	775.73	A
USGS	08091730	2004-04-25	776.00	A	775.84	A	775.94	A
USGS	08091730	2004-04-26	776.01	A	775.91	A	775.95	A
USGS	08091730	2004-04-27	775.91	A	775.83	A	775.87	A
USGS	08091730	2004-04-28	775.83	A	775.77	A	775.80	A
USGS	08091730	2004-04-29	775.78	A	775.70	A	775.74	A
USGS	08091730	2004-04-30	775.75	A	775.66	A	775.69	A
USGS	08091730	2004-05-01	775.94	A	775.72	A	775.86	A
USGS	08091730	2004-05-02	775.92	A	775.85	A	775.89	A
USGS	08091730	2004-05-03	775.85	A	775.78	A	775.81	A
USGS	08091730	2004-05-04	775.78	A	775.68	A	775.73	A
USGS	08091730	2004-05-05	775.69	A	775.63	A	775.66	A
USGS	08091730	2004-05-06	775.63	A	775.58	A	775.60	A
USGS	08091730	2004-05-07	775.58	A	775.54	A	775.56	A
USGS	08091730	2004-05-08	775.54	A	775.52	A	775.53	A
USGS	08091730	2004-05-09	775.53	A	775.49	A	775.51	A
USGS	08091730	2004-05-10	775.49	A	775.46	A	775.48	A
USGS	08091730	2004-05-11	775.47	A	775.43	A	775.45	A
USGS	08091730	2004-05-12	775.45	A	775.42	A	775.43	A
USGS	08091730	2004-05-13	775.46	A	775.37	A	775.41	A
USGS	08091730	2004-05-14	775.40	A	775.34	A	775.37	A
USGS	08091730	2004-05-15	775.35	A	775.33	A	775.34	A
USGS	08091730	2004-05-16	775.34	A	775.31	A	775.33	A
USGS	08091730	2004-05-17	775.32	A	775.30	A	775.31	A
USGS	08091730	2004-05-18	775.31	A	775.28	A	775.30	A
USGS	08091730	2004-05-19	775.29	A	775.27	A	775.28	A
USGS	08091730	2004-05-20	775.28	A	775.25	A	775.27	A
USGS	08091730	2004-05-21	775.26	A	775.22	A	775.24	A
USGS	08091730	2004-05-22	775.24	A	775.19	A	775.22	A
USGS	08091730	2004-05-23	775.22	A	775.18	A	775.19	A
USGS	08091730	2004-05-24	775.19	A	775.17	A	775.18	A
USGS	08091730	2004-05-25	775.19	A	775.17	A	775.18	A
USGS	08091730	2004-05-26	775.20	A	775.18	A	775.19	A
USGS	08091730	2004-05-27	775.34	A	775.18	A	775.22	A
USGS	08091730	2004-05-28	775.33	A	775.31	A	775.31	A
USGS	08091730	2004-05-29	775.34	A	775.31	A	775.32	A
USGS	08091730	2004-05-30	775.34	A	775.31	A	775.33	A
USGS	08091730	2004-05-31	775.38	A	775.32	A	775.34	A
USGS	08091730	2004-06-01	775.48	A	775.35	A	775.38	A
USGS	08091730	2004-06-02	775.38	A	775.34	A	775.35	A
USGS	08091730	2004-06-03	775.43	A	775.14	A	775.35	A
USGS	08091730	2004-06-04	775.38	A	775.36	A	775.37	A
USGS	08091730	2004-06-05	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-06-06	775.39	A	775.36	A	775.37	A
USGS	08091730	2004-06-07	775.39	A	775.34	A	775.37	A
USGS	08091730	2004-06-08	775.59	A	775.35	A	775.41	A
USGS	08091730	2004-06-09	777.97	A	775.59	A	777.29	A
USGS	08091730	2004-06-10	777.87	A	777.23	A	777.55	A
USGS	08091730	2004-06-11	777.23	A	776.74	A	776.98	A
USGS	08091730	2004-06-12	776.74	A	776.40	A	776.57	A
USGS	08091730	2004-06-13	776.40	A	776.15	A	776.27	A
USGS	08091730	2004-06-14	776.15	A	775.96	A	776.05	A
USGS	08091730	2004-06-15	775.96	A	775.82	A	775.89	A
USGS	08091730	2004-06-16	775.82	A	775.70	A	775.76	A
USGS	08091730	2004-06-17	775.70	A	775.60	A	775.66	A
USGS	08091730	2004-06-18	775.60	A	775.52	A	775.56	A
USGS	08091730	2004-06-19	775.52	A	775.46	A	775.49	A
USGS	08091730	2004-06-20	775.46	A	775.39	A	775.43	A
USGS	08091730	2004-06-21	775.40	A	775.36	A	775.37	A
USGS	08091730	2004-06-22	775.37	A	775.34	A	775.36	A
USGS	08091730	2004-06-23	775.36	A	775.35	A	775.35	A
USGS	08091730	2004-06-24	775.38	A	775.35	A	775.36	A
USGS	08091730	2004-06-25	775.49	A	775.37	A	775.40	A
USGS	08091730	2004-06-26	775.52	A	775.49	A	775.51	A
USGS	08091730	2004-06-27	775.54	A	775.51	A	775.53	A
USGS	08091730	2004-06-28	775.75	A	775.52	A	775.62	A
USGS	08091730	2004-06-29	775.86	A	775.75	A	775.78	A
USGS	08091730	2004-06-30	776.01	A	775.85	A	775.93	A
USGS	08091730	2004-07-01	776.00	A	775.89	A	775.95	A
USGS	08091730	2004-07-02	775.89	A	775.77	A	775.83	A
USGS	08091730	2004-07-03	775.77	A	775.65	A	775.71	A

USGS	08091730	2004-07-04	775.66	A	775.55	A	775.61	A
USGS	08091730	2004-07-05	775.56	A	775.47	A	775.51	A
USGS	08091730	2004-07-06	775.47	A	775.40	A	775.43	A
USGS	08091730	2004-07-07	775.40	A	775.34	A	775.37	A
USGS	08091730	2004-07-08	775.35	A	775.30	A	775.32	A
USGS	08091730	2004-07-09	775.31	A	775.29	A	775.30	A
USGS	08091730	2004-07-10	775.29	A	775.28	A	775.29	A
USGS	08091730	2004-07-11	775.29	A	775.27	A	775.28	A
USGS	08091730	2004-07-12	775.28	A	775.26	A	775.27	A
USGS	08091730	2004-07-13	775.27	A	775.26	A	775.27	A
USGS	08091730	2004-07-14	775.27	A	775.26	A	775.26	A
USGS	08091730	2004-07-15	775.27	A	775.26	A	775.26	A
USGS	08091730	2004-07-16	775.27	A	775.25	A	775.26	A
USGS	08091730	2004-07-17	775.26	A	775.24	A	775.25	A
USGS	08091730	2004-07-18	775.24	A	775.23	A	775.24	A
USGS	08091730	2004-07-19	775.24	A	775.23	A	775.23	A
USGS	08091730	2004-07-20	775.24	A	775.22	A	775.23	A
USGS	08091730	2004-07-21	775.23	A	775.21	A	775.22	A
USGS	08091730	2004-07-22	775.22	A	775.20	A	775.21	A
USGS	08091730	2004-07-23	775.21	A	775.18	A	775.20	A
USGS	08091730	2004-07-24	775.21	A	775.19	A	775.20	A
USGS	08091730	2004-07-25	775.20	A	775.16	A	775.19	A
USGS	08091730	2004-07-26	775.17	A	775.14	A	775.15	A
USGS	08091730	2004-07-27	775.16	A	775.14	A	775.15	A
USGS	08091730	2004-07-28	775.20	A	775.14	A	775.16	A
USGS	08091730	2004-07-29	775.25	A	775.18	A	775.24	A
USGS	08091730	2004-07-30	775.26	A	775.25	A	775.26	A
USGS	08091730	2004-07-31	775.27	A	775.25	A	775.26	A
USGS	08091730	2004-08-01	775.28	A	775.26	A	775.27	A
USGS	08091730	2004-08-02	775.29	A	775.27	A	775.28	A
USGS	08091730	2004-08-03	775.29	A	775.27	A	775.28	A
USGS	08091730	2004-08-04	775.28	A	775.26	A	775.27	A
USGS	08091730	2004-08-05	775.28	A	775.26	A	775.27	A
USGS	08091730	2004-08-06	775.27	A	775.25	A	775.26	A
USGS	08091730	2004-08-07	775.26	A	775.25	A	775.25	A
USGS	08091730	2004-08-08	775.26	A	775.24	A	775.25	A
USGS	08091730	2004-08-09	775.27	A	775.25	A	775.26	A
USGS	08091730	2004-08-10	775.28	A	775.26	A	775.27	A
USGS	08091730	2004-08-11	775.31	A	775.26	A	775.28	A
USGS	08091730	2004-08-12	775.26	A	775.24	A	775.25	A
USGS	08091730	2004-08-13	775.26	A	775.24	A	775.25	A
USGS	08091730	2004-08-14	775.25	A	775.24	A	775.24	A
USGS	08091730	2004-08-15	775.25	A	775.24	A	775.24	A
USGS	08091730	2004-08-16	775.25	A	775.23	A	775.24	A
USGS	08091730	2004-08-17	775.25	A	775.24	A	775.24	A
USGS	08091730	2004-08-18	775.26	A	775.24	A	775.25	A
USGS	08091730	2004-08-19	775.49	A	775.24	A	775.37	A
USGS	08091730	2004-08-20	775.50	A	775.47	A	775.49	A
USGS	08091730	2004-08-21	775.49	A	775.47	A	775.48	A
USGS	08091730	2004-08-22	775.48	A	775.46	A	775.48	A
USGS	08091730	2004-08-23	775.47	A	775.45	A	775.46	A
USGS	08091730	2004-08-24	775.46	A	775.44	A	775.45	A
USGS	08091730	2004-08-25	775.44	A	775.42	A	775.43	A
USGS	08091730	2004-08-26	775.43	A	775.40	A	775.42	A
USGS	08091730	2004-08-27	775.41	A	775.39	A	775.40	A
USGS	08091730	2004-08-28	775.43	A	775.39	A	775.41	A
USGS	08091730	2004-08-29	775.43	A	775.41	A	775.42	A
USGS	08091730	2004-08-30	775.43	A	775.41	A	775.42	A
USGS	08091730	2004-08-31	775.42	A	775.41	A	775.41	A
USGS	08091730	2004-09-01	775.42	A	775.41	A	775.41	A
USGS	08091730	2004-09-02	775.42	A	775.40	A	775.41	A
USGS	08091730	2004-09-03	775.41	A	775.39	A	775.40	A
USGS	08091730	2004-09-04	775.40	A	775.39	A	775.40	A
USGS	08091730	2004-09-05	775.40	A	775.39	A	775.39	A
USGS	08091730	2004-09-06	775.44	A	775.39	A	775.41	A
USGS	08091730	2004-09-07	775.41	A	775.37	A	775.39	A
USGS	08091730	2004-09-08	775.38	A	775.36	A	775.36	A
USGS	08091730	2004-09-09	775.37	A	775.35	A	775.36	A
USGS	08091730	2004-09-10	775.38	A	775.36	A	775.37	A
USGS	08091730	2004-09-11	775.39	A	775.37	A	775.38	A
USGS	08091730	2004-09-12	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-09-13	775.40	A	775.39	A	775.39	A
USGS	08091730	2004-09-14	775.44	A	775.39	A	775.41	A
USGS	08091730	2004-09-15	775.44	A	775.42	A	775.43	A
USGS	08091730	2004-09-16	775.45	A	775.43	A	775.43	A
USGS	08091730	2004-09-17	775.46	A	775.43	A	775.44	A
USGS	08091730	2004-09-18	775.45	A	775.43	A	775.44	A
USGS	08091730	2004-09-19	775.44	A	775.42	A	775.43	A
USGS	08091730	2004-09-20	775.42	A	775.39	A	775.41	A
USGS	08091730	2004-09-21	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-09-22	775.39	A	775.37	A	775.38	A
USGS	08091730	2004-09-23	775.38	A	775.37	A	775.38	A
USGS	08091730	2004-09-24	775.38	A	775.36	A	775.37	A
USGS	08091730	2004-09-25	775.37	A	775.34	A	775.36	A
USGS	08091730	2004-09-26	775.35	A	775.34	A	775.34	A
USGS	08091730	2004-09-27	775.34	A	775.33	A	775.34	A
USGS	08091730	2004-09-28	775.34	A	775.32	A	775.33	A
USGS	08091730	2004-09-29	775.33	A	775.31	A	775.32	A
USGS	08091730	2004-09-30	775.32	A	775.30	A	775.31	A
USGS	08091730	2004-10-01	775.30	A	775.28	A	775.29	A
USGS	08091730	2004-10-02	775.29	A	775.26	A	775.27	A
USGS	08091730	2004-10-03	775.28	A	775.25	A	775.26	A
USGS	08091730	2004-10-04	775.41	A	775.27	A	775.32	A
USGS	08091730	2004-10-05	775.40	A	775.38	A	775.39	A
USGS	08091730	2004-10-06	775.39	A	775.37	A	775.38	A
USGS	08091730	2004-10-07	775.38	A	775.36	A	775.37	A
USGS	08091730	2004-10-08	775.38	A	775.36	A	775.37	A
USGS	08091730	2004-10-09	775.37	A	775.34	A	775.36	A
USGS	08091730	2004-10-10	775.35	A	775.31	A	775.34	A
USGS	08091730	2004-10-11	775.32	A	775.28	A	775.30	A

USGS	08091730	2004-10-12	775.29	A	775.26	A	775.27	A
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USGS	08091730	2004-10-14	775.28	A	775.22	A	775.25	A
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USGS	08091730	2004-10-16	775.22	A	775.21	A	775.22	A
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USGS	08091730	2004-10-18	775.24	A	775.22	A	775.23	A
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USGS	08091730	2004-10-22	775.33	A	775.26	A	775.27	A
USGS	08091730	2004-10-23	775.33	A	775.29	A	775.30	A
USGS	08091730	2004-10-24	775.35	A	775.29	A	775.31	A
USGS	08091730	2004-10-25	775.35	A	775.33	A	775.34	A
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USGS	08091730	2004-10-27	775.35	A	775.34	A	775.34	A
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USGS	08091730	2004-11-02	775.24	A	775.19	A	775.21	A
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USGS	08091730	2004-11-09	774.94	A	774.92	A	774.93	A
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USGS	08091730	2004-11-16	775.07	A	775.03	A	775.05	A
USGS	08091730	2004-11-17	775.46	A	775.07	A	775.29	A
USGS	08091730	2004-11-18	775.48	A	775.46	A	775.47	A
USGS	08091730	2004-11-19	775.48	A	775.45	A	775.47	A
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USGS	08091730	2004-11-23	775.67	A	775.64	A	775.66	A
USGS	08091730	2004-11-24	775.66	A	775.56	A	775.60	A
USGS	08091730	2004-11-25	775.57	A	775.51	A	775.54	A
USGS	08091730	2004-11-26	775.52	A	775.47	A	775.50	A
USGS	08091730	2004-11-27	775.48	A	775.42	A	775.44	A
USGS	08091730	2004-11-28	775.43	A	775.39	A	775.41	A
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USGS	08091730	2004-12-02	775.34	A	775.31	A	775.33	A
USGS	08091730	2004-12-03	775.33	A	775.31	A	775.32	A
USGS	08091730	2004-12-04	775.33	A	775.32	A	775.32	A
USGS	08091730	2004-12-05	775.34	A	775.31	A	775.33	A
USGS	08091730	2004-12-06	775.37	A	775.31	A	775.34	A
USGS	08091730	2004-12-07	775.37	A	775.36	A	775.37	A
USGS	08091730	2004-12-08	775.38	A	775.35	A	775.36	A
USGS	08091730	2004-12-09	775.36	A	775.33	A	775.35	A
USGS	08091730	2004-12-10	775.36	A	775.30	A	775.33	A
USGS	08091730	2004-12-11	775.32	A	775.31	A	775.31	A
USGS	08091730	2004-12-12	775.32	A	775.30	A	775.31	A
USGS	08091730	2004-12-13	775.34	A	775.27	A	775.30	A
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USGS	08091730	2004-12-19	775.27	A	775.25	A	775.26	A
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USGS	08091730	2004-12-21	775.25	A	775.22	A	775.24	A
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USGS	08091730	2004-12-26	775.22	A	775.20	A	775.21	A
USGS	08091730	2004-12-27	775.22	A	775.21	A	775.21	A
USGS	08091730	2004-12-28	775.23	A	775.21	A	775.22	A
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USGS	08091730	2005-01-03	775.36	A	775.29	A	775.34	A
USGS	08091730	2005-01-04	775.37	A	775.35	A	775.36	A
USGS	08091730	2005-01-05	775.38	A	775.30	A	775.34	A
USGS	08091730	2005-01-06	775.32	A	775.22	A	775.26	A
USGS	08091730	2005-01-07	775.23	A	775.18	A	775.20	A
USGS	08091730	2005-01-08	775.19	A	775.13	A	775.16	A
USGS	08091730	2005-01-09	775.14	A	775.11	A	775.12	A
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USGS	08091730	2005-01-14	774.98	A	774.94	A	774.96	A
USGS	08091730	2005-01-15	774.94	A	774.91	A	774.93	A
USGS	08091730	2005-01-16	774.92	A	774.86	A	774.89	A
USGS	08091730	2005-01-17	774.87	A	774.83	A	774.85	A
USGS	08091730	2005-01-18	774.84	A	774.80	A	774.82	A
USGS	08091730	2005-01-19	774.81	A	774.78	A	774.79	A

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USGS	08091730	2005-01-22	774.77	A	774.69	A	774.73	A
USGS	08091730	2005-01-23	774.69	A	774.64	A	774.67	A
USGS	08091730	2005-01-24	774.65	A	774.61	A	774.63	A
USGS	08091730	2005-01-25	774.62	A	774.57	A	774.60	A
USGS	08091730	2005-01-26	774.59	A	774.55	A	774.57	A
USGS	08091730	2005-01-27	774.58	A	774.53	A	774.56	A
USGS	08091730	2005-01-28	774.58	A	774.55	A	774.57	A
USGS	08091730	2005-01-29	774.56	A	774.53	A	774.55	A
USGS	08091730	2005-01-30	774.56	A	774.52	A	774.53	A
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USGS	08091730	2005-02-01	774.52	A	774.49	A	774.50	A
USGS	08091730	2005-02-02	774.51	A	774.46	A	774.48	A
USGS	08091730	2005-02-03	774.47	A	774.45	A	774.46	A
USGS	08091730	2005-02-04	774.45	A	774.44	A	774.44	A
USGS	08091730	2005-02-05	774.44	A	774.42	A	774.43	A
USGS	08091730	2005-02-06	774.43	A	774.41	A	774.42	A
USGS	08091730	2005-02-07	774.42	A	774.39	A	774.40	A
USGS	08091730	2005-02-08	774.40	A	774.35	A	774.38	A
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USGS	08091730	2005-02-24	774.41	A	774.32	A	774.38	A
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USGS	08091730	2005-03-02	774.54	A	774.48	A	774.51	A
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USGS	08091730	2005-03-27	773.92	A	773.83	A	773.87	A
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USGS	08091730	2005-04-20	773.23	A	773.18	A	773.21	A
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USGS	08091730	2005-05-03	773.10	A	773.06	A	773.08	A
USGS	08091730	2005-05-04	773.20	A	773.10	A	773.14	A
USGS	08091730	2005-05-05	773.26	A	773.19	A	773.24	A
USGS	08091730	2005-05-06	773.30	A	773.26	A	773.28	A
USGS	08091730	2005-05-07	773.32	A	773.29	A	773.31	A
USGS	08091730	2005-05-08	773.38	A	773.30	A	773.34	A
USGS	08091730	2005-05-09	773.42	A	773.36	A	773.39	A
USGS	08091730	2005-05-10	773.45	A	773.40	A	773.43	A
USGS	08091730	2005-05-11	773.50	A	773.44	A	773.47	A
USGS	08091730	2005-05-12	773.51	A	773.46	A	773.49	A
USGS	08091730	2005-05-13	773.54	A	773.50	A	773.52	A
USGS	08091730	2005-05-14	773.60	A	773.53	A	773.58	A
USGS	08091730	2005-05-15	773.63	A	773.59	A	773.61	A
USGS	08091730	2005-05-16	773.65	A	773.62	A	773.64	A
USGS	08091730	2005-05-17	773.68	A	773.64	A	773.66	A
USGS	08091730	2005-05-18	773.69	A	773.66	A	773.68	A
USGS	08091730	2005-05-19	773.72	A	773.69	A	773.70	A
USGS	08091730	2005-05-20	773.76	A	773.71	A	773.74	A
USGS	08091730	2005-05-21	773.80	A	773.76	A	773.78	A
USGS	08091730	2005-05-22	773.83	A	773.79	A	773.81	A
USGS	08091730	2005-05-23	773.85	A	773.82	A	773.84	A
USGS	08091730	2005-05-24	773.86	A	773.84	A	773.85	A
USGS	08091730	2005-05-25	773.89	A	773.86	A	773.87	A
USGS	08091730	2005-05-26	773.91	A	773.88	A	773.89	A
USGS	08091730	2005-05-27	773.93	A	773.90	A	773.92	A
USGS	08091730	2005-05-28	774.05	A	773.93	A	773.99	A
USGS	08091730	2005-05-29	774.08	A	774.04	A	774.06	A
USGS	08091730	2005-05-30	774.11	A	774.08	A	774.09	A
USGS	08091730	2005-05-31	774.13	A	774.10	A	774.12	A
USGS	08091730	2005-06-01	774.22	A	774.13	A	774.20	A
USGS	08091730	2005-06-02	774.23	A	774.20	A	774.22	A
USGS	08091730	2005-06-03	774.29	A	774.22	A	774.25	A
USGS	08091730	2005-06-04	774.29	A	774.26	A	774.28	A
USGS	08091730	2005-06-05	774.30	A	774.28	A	774.29	A
USGS	08091730	2005-06-06	774.32	A	774.29	A	774.31	A
USGS	08091730	2005-06-07	774.33	A	774.31	A	774.32	A
USGS	08091730	2005-06-08	774.35	A	774.32	A	774.34	A
USGS	08091730	2005-06-09	774.36	A	774.34	A	774.35	A
USGS	08091730	2005-06-10	774.36	A	774.34	A	774.35	A
USGS	08091730	2005-06-11	774.37	A	774.35	A	774.36	A
USGS	08091730	2005-06-12	774.39	A	774.35	A	774.37	A
USGS	08091730	2005-06-13	774.39	A	774.37	A	774.38	A
USGS	08091730	2005-06-14	774.42	A	774.36	A	774.40	A
USGS	08091730	2005-06-15	774.45	A	774.42	A	774.43	A
USGS	08091730	2005-06-16	774.47	A	774.44	A	774.46	A
USGS	08091730	2005-06-17	774.48	A	774.46	A	774.47	A
USGS	08091730	2005-06-18	774.49	A	774.47	A	774.48	A
USGS	08091730	2005-06-19	774.50	A	774.48	A	774.49	A
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USGS	08091730	2005-06-21	774.52	A	774.50	A	774.51	A
USGS	08091730	2005-06-22	774.53	A	774.51	A	774.52	A
USGS	08091730	2005-06-23	774.54	A	774.52	A	774.53	A
USGS	08091730	2005-06-24	774.55	A	774.53	A	774.54	A
USGS	08091730	2005-06-25	774.55	A	774.53	A	774.54	A
USGS	08091730	2005-06-26	774.56	A	774.54	A	774.55	A
USGS	08091730	2005-06-27	774.56	A	774.55	A	774.55	A
USGS	08091730	2005-06-28	774.57	A	774.55	A	774.56	A
USGS	08091730	2005-06-29	774.58	A	774.56	A	774.57	A
USGS	08091730	2005-06-30	774.58	A	774.56	A	774.57	A
USGS	08091730	2005-07-01	774.63	A	774.56	A	774.58	A
USGS	08091730	2005-07-02	774.60	A	774.56	A	774.58	A
USGS	08091730	2005-07-03	774.60	A	774.58	A	774.59	A
USGS	08091730	2005-07-04	774.60	A	774.56	A	774.58	A
USGS	08091730	2005-07-05	774.61	A	774.57	A	774.59	A
USGS	08091730	2005-07-06	774.62	A	774.60	A	774.61	A
USGS	08091730	2005-07-07	774.69	A	774.61	A	774.63	A
USGS	08091730	2005-07-08	774.64	A	774.61	A	774.63	A
USGS	08091730	2005-07-09	774.65	A	774.63	A	774.64	A
USGS	08091730	2005-07-10	774.66	A	774.64	A	774.65	A
USGS	08091730	2005-07-11	774.68	A	774.65	A	774.67	A
USGS	08091730	2005-07-12	774.69	A	774.67	A	774.68	A
USGS	08091730	2005-07-13	774.72	A	774.67	A	774.69	A
USGS	08091730	2005-07-14	774.72	A	774.69	A	774.70	A
USGS	08091730	2005-07-15	774.74	A	774.69	A	774.71	A
USGS	08091730	2005-07-16	774.75	A	774.72	A	774.74	A
USGS	08091730	2005-07-17	774.76	A	774.72	A	774.75	A
USGS	08091730	2005-07-18	774.75	A	774.73	A	774.74	A
USGS	08091730	2005-07-19	774.76	A	774.73	A	774.74	A
USGS	08091730	2005-07-20	774.76	A	774.74	A	774.75	A
USGS	08091730	2005-07-21	774.77	A	774.75	A	774.76	A
USGS	08091730	2005-07-22	774.78	A	774.76	A	774.77	A
USGS	08091730	2005-07-23	774.78	A	774.76	A	774.78	A
USGS	08091730	2005-07-24	774.79	A	774.77	A	774.78	A
USGS	08091730	2005-07-25	774.83	A	774.67	A	774.78	A
USGS	08091730	2005-07-26	774.79	A	774.68	A	774.77	A
USGS	08091730	2005-07-27	774.83	A	774.68	A	774.79	A
USGS	08091730	2005-07-28	774.85	A	774.71	A	774.82	A
USGS	08091730	2005-07-29	774.86	A	774.76	A	774.84	A
USGS	08091730	2005-07-30	774.90	A	774.81	A	774.88	A
USGS	08091730	2005-07-31	774.93	A	774.80	A	774.90	A
USGS	08091730	2005-08-01	774.98	A	774.84	A	774.95	A
USGS	08091730	2005-08-02	775.01	A	774.98	A	774.99	A
USGS	08091730	2005-08-03	775.03	A	774.99	A	775.01	A
USGS	08091730	2005-08-04	775.04	A	775.00	A	775.02	A
USGS	08091730	2005-08-05	775.05	A	775.02	A	775.04	A
USGS	08091730	2005-08-06	775.07	A	775.05	A	775.06	A
USGS	08091730	2005-08-07	775.09	A	775.06	A	775.08	A

USGS	08091730	2005-08-08	775.19	A	775.08	A	775.14	A
USGS	08091730	2005-08-09	775.21	A	775.17	A	775.19	A
USGS	08091730	2005-08-10	775.21	A	775.19	A	775.20	A
USGS	08091730	2005-08-11	775.22	A	775.18	A	775.21	A
USGS	08091730	2005-08-12	775.22	A	775.18	A	775.20	A
USGS	08091730	2005-08-13	775.20	A	775.18	A	775.19	A
USGS	08091730	2005-08-14	775.22	A	775.19	A	775.20	A
USGS	08091730	2005-08-15	775.26	A	775.21	A	775.23	A
USGS	08091730	2005-08-16	775.28	A	775.25	A	775.26	A
USGS	08091730	2005-08-17	775.28	A	775.26	A	775.27	A
USGS	08091730	2005-08-18	775.28	A	775.26	A	775.27	A
USGS	08091730	2005-08-19	775.28	A	775.25	A	775.27	A
USGS	08091730	2005-08-20	775.27	A	775.25	A	775.26	A
USGS	08091730	2005-08-21	775.28	A	775.25	A	775.26	A
USGS	08091730	2005-08-22	775.26	A	775.24	A	775.25	A
USGS	08091730	2005-08-23	775.28	A	775.25	A	775.25	A
USGS	08091730	2005-08-24	775.26	A	775.23	A	775.24	A
USGS	08091730	2005-08-25	775.26	A	775.22	A	775.23	A
USGS	08091730	2005-08-26	775.24	A	775.22	A	775.23	A
USGS	08091730	2005-08-27	775.27	A	775.22	A	775.23	A
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USGS	08091730	2005-08-31	775.23	A	775.21	A	775.21	A
USGS	08091730	2005-09-01	775.24	A	775.21	A	775.22	A
USGS	08091730	2005-09-02	775.24	A	775.21	A	775.22	A
USGS	08091730	2005-09-03	775.27	A	775.20	A	775.21	A
USGS	08091730	2005-09-04	775.28	A	775.20	A	775.21	A
USGS	08091730	2005-09-05	775.28	A	775.19	A	775.23	A
USGS	08091730	2005-09-06	775.26	A	775.18	A	775.21	A
USGS	08091730	2005-09-07	775.25	A	775.20	A	775.22	A
USGS	08091730	2005-09-08	775.22	A	775.20	A	775.22	A
USGS	08091730	2005-09-09	775.26	A	775.21	A	775.22	A
USGS	08091730	2005-09-10	775.24	A	775.20	A	775.22	A
USGS	08091730	2005-09-11	775.21	A	775.19	A	775.20	A
USGS	08091730	2005-09-12	775.23	A	775.19	A	775.20	A
USGS	08091730	2005-09-13	775.22	A	775.18	A	775.20	A
USGS	08091730	2005-09-14	775.22	A	775.17	A	775.19	A
USGS	08091730	2005-09-15	775.22	A	775.17	A	775.19	A
USGS	08091730	2005-09-16	775.34	A	775.18	A	775.29	A
USGS	08091730	2005-09-17	775.34	A	775.30	A	775.30	A
USGS	08091730	2005-09-18	775.34	A	775.29	A	775.30	A
USGS	08091730	2005-09-19	775.33	A	775.28	A	775.29	A
USGS	08091730	2005-09-20	775.31	A	775.27	A	775.29	A
USGS	08091730	2005-09-21	775.32	A	775.28	A	775.28	A
USGS	08091730	2005-09-22	775.33	A	775.28	A	775.29	A
USGS	08091730	2005-09-23	775.32	A	775.28	A	775.29	A
USGS	08091730	2005-09-24	775.28	A	775.24	A	775.26	A
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USGS	08091730	2005-09-26	775.25	A	775.23	A	775.24	A
USGS	08091730	2005-09-27	775.25	A	775.22	A	775.24	A
USGS	08091730	2005-09-28	775.27	A	775.22	A	775.25	A
USGS	08091730	2005-09-29	775.26	A	775.19	A	775.22	A
USGS	08091730	2005-09-30	775.24	A	775.19	A	775.20	A
USGS	08091730	2005-10-01	775.21	A	775.18	A	775.20	A
USGS	08091730	2005-10-02	775.20	A	775.18	A	775.19	A
USGS	08091730	2005-10-03	775.21	A	775.19	A	775.20	A
USGS	08091730	2005-10-04	775.22	A	775.19	A	775.20	A
USGS	08091730	2005-10-05	775.25	A	775.20	A	775.21	A
USGS	08091730	2005-10-06	775.24	A	775.15	A	775.19	A
USGS	08091730	2005-10-07	775.17	A	775.14	A	775.15	A
USGS	08091730	2005-10-08	775.17	A	775.13	A	775.15	A
USGS	08091730	2005-10-09	775.18	A	775.14	A	775.15	A
USGS	08091730	2005-10-10	775.19	A	775.14	A	775.17	A
USGS	08091730	2005-10-11	775.21	A	775.17	A	775.19	A
USGS	08091730	2005-10-12	775.25	A	775.20	A	775.22	A
USGS	08091730	2005-10-13	775.26	A	775.23	A	775.24	A
USGS	08091730	2005-10-14	775.27	A	775.23	A	775.26	A
USGS	08091730	2005-10-15	775.30	A	775.26	A	775.27	A
USGS	08091730	2005-10-16	775.30	A	775.28	A	775.29	A
USGS	08091730	2005-10-17	775.32	A	775.29	A	775.30	A
USGS	08091730	2005-10-18	775.33	A	775.31	A	775.31	A
USGS	08091730	2005-10-19	775.34	A	775.31	A	775.32	A
USGS	08091730	2005-10-20	775.32	A	775.31	A	775.31	A
USGS	08091730	2005-10-21	775.32	A	775.30	A	775.31	A
USGS	08091730	2005-10-22	775.33	A	775.29	A	775.30	A
USGS	08091730	2005-10-23	775.35	A	775.24	A	775.29	A
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USGS	08091730	2005-10-25	775.29	A	775.24	A	775.26	A
USGS	08091730	2005-10-26	775.29	A	775.26	A	775.27	A
USGS	08091730	2005-10-27	775.30	A	775.26	A	775.28	A
USGS	08091730	2005-10-28	775.31	A	775.28	A	775.30	A
USGS	08091730	2005-10-29	775.31	A	775.28	A	775.30	A
USGS	08091730	2005-10-30	775.32	A	775.29	A	775.31	A
USGS	08091730	2005-10-31	775.39	A	775.31	A	775.34	A
USGS	08091730	2005-11-01	775.36	A	775.33	A	775.35	A
USGS	08091730	2005-11-02	775.37	A	775.34	A	775.36	A
USGS	08091730	2005-11-03	775.38	A	775.35	A	775.36	A
USGS	08091730	2005-11-04	775.39	A	775.35	A	775.37	A
USGS	08091730	2005-11-05	775.41	A	775.36	A	775.38	A
USGS	08091730	2005-11-06	775.41	A	775.38	A	775.39	A
USGS	08091730	2005-11-07	775.42	A	775.39	A	775.40	A
USGS	08091730	2005-11-08	775.43	A	775.40	A	775.41	A
USGS	08091730	2005-11-09	775.45	A	775.40	A	775.42	A
USGS	08091730	2005-11-10	775.41	A	775.36	A	775.38	A
USGS	08091730	2005-11-11	775.40	A	775.34	A	775.36	A
USGS	08091730	2005-11-12	775.38	A	775.34	A	775.35	A
USGS	08091730	2005-11-13	775.36	A	775.32	A	775.33	A
USGS	08091730	2005-11-14	775.33	A	775.29	A	775.31	A
USGS	08091730	2005-11-15	775.32	A	775.22	A	775.27	A

USGS	08091730	2005-11-16	775.23	A	775.18	A	775.20	A
USGS	08091730	2005-11-17	775.21	A	775.15	A	775.18	A
USGS	08091730	2005-11-18	775.18	A	775.15	A	775.17	A
USGS	08091730	2005-11-19	775.18	A	775.15	A	775.17	A
USGS	08091730	2005-11-20	775.18	A	775.11	A	775.15	A
USGS	08091730	2005-11-21	775.16	A	775.12	A	775.14	A
USGS	08091730	2005-11-22	775.16	A	775.12	A	775.13	A
USGS	08091730	2005-11-23	775.15	A	775.11	A	775.13	A
USGS	08091730	2005-11-24	775.15	A	775.12	A	775.14	A
USGS	08091730	2005-11-25	775.15	A	775.11	A	775.13	A
USGS	08091730	2005-11-26	775.15	A	775.12	A	775.14	A
USGS	08091730	2005-11-27	775.16	A	775.05	A	775.11	A
USGS	08091730	2005-11-28	775.09	A	775.02	A	775.06	A
USGS	08091730	2005-11-29	775.06	A	775.01	A	775.03	A
USGS	08091730	2005-11-30	775.05	A	774.97	A	775.02	A
USGS	08091730	2005-12-01	775.04	A	774.98	A	775.00	A
USGS	08091730	2005-12-02	775.00	A	774.95	A	774.98	A
USGS	08091730	2005-12-03	775.00	A	774.94	A	774.98	A
USGS	08091730	2005-12-04	774.99	A	774.92	A	774.96	A
USGS	08091730	2005-12-05	774.96	A	774.89	A	774.92	A
USGS	08091730	2005-12-06	774.93	A	774.88	A	774.90	A
USGS	08091730	2005-12-07	774.93	A	774.84	A	774.89	A
USGS	08091730	2005-12-08	774.88	A	774.80	A	774.84	A
USGS	08091730	2005-12-09	774.85	A	774.80	A	774.83	A
USGS	08091730	2005-12-10	774.86	A	774.80	A	774.84	A
USGS	08091730	2005-12-11	774.85	A	774.81	A	774.84	A
USGS	08091730	2005-12-12	774.86	A	774.83	A	774.84	A
USGS	08091730	2005-12-13	774.84	A	774.81	A	774.83	A
USGS	08091730	2005-12-14	774.84	A	774.81	A	774.83	A
USGS	08091730	2005-12-15	774.83	A	774.80	A	774.81	A
USGS	08091730	2005-12-16	774.82	A	774.79	A	774.80	A
USGS	08091730	2005-12-17	774.82	A	774.80	A	774.80	A
USGS	08091730	2005-12-18	774.81	A	774.79	A	774.80	A
USGS	08091730	2005-12-19	774.82	A	774.79	A	774.81	A
USGS	08091730	2005-12-20	774.81	A	774.79	A	774.80	A
USGS	08091730	2005-12-21	774.82	A	774.80	A	774.80	A
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USGS	08091730	2005-12-23	774.82	A	774.78	A	774.80	A
USGS	08091730	2005-12-24	774.82	A	774.76	A	774.79	A
USGS	08091730	2005-12-25	774.79	A	774.76	A	774.77	A
USGS	08091730	2005-12-26	774.80	A	774.76	A	774.78	A
USGS	08091730	2005-12-27	774.79	A	774.76	A	774.77	A
USGS	08091730	2005-12-28	774.78	A	774.75	A	774.76	A
USGS	08091730	2005-12-29	774.78	A	774.74	A	774.76	A
USGS	08091730	2005-12-30	774.79	A	774.74	A	774.76	A
USGS	08091730	2005-12-31	774.78	A	774.74	A	774.75	A
USGS	08091730	2006-01-01	774.77	A	774.72	A	774.75	A
USGS	08091730	2006-01-02	774.76	A	774.72	A	774.73	A
USGS	08091730	2006-01-03	774.75	A	774.72	A	774.73	A
USGS	08091730	2006-01-04	774.76	A	774.70	A	774.72	A
USGS	08091730	2006-01-05	774.71	A	774.64	A	774.68	A
USGS	08091730	2006-01-06	774.66	A	774.61	A	774.64	A
USGS	08091730	2006-01-07	774.64	A	774.57	A	774.61	A
USGS	08091730	2006-01-08	774.59	A	774.53	A	774.56	A
USGS	08091730	2006-01-09	774.55	A	774.49	A	774.53	A
USGS	08091730	2006-01-10	774.51	A	774.45	A	774.47	A
USGS	08091730	2006-01-11	774.46	A	774.41	A	774.44	A
USGS	08091730	2006-01-12	774.44	A	774.30	A	774.41	A
USGS	08091730	2006-01-13	774.40	A	774.32	A	774.36	A
USGS	08091730	2006-01-14	774.35	A	774.30	A	774.32	A
USGS	08091730	2006-01-15	774.33	A	774.27	A	774.29	A
USGS	08091730	2006-01-16	774.29	A	774.17	A	774.26	A
USGS	08091730	2006-01-17	774.24	A	774.17	A	774.20	A
USGS	08091730	2006-01-18	774.18	A	774.12	A	774.16	A
USGS	08091730	2006-01-19	774.15	A	774.09	A	774.12	A
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USGS	08091730	2006-01-27	774.06	A	774.02	A	774.04	A
USGS	08091730	2006-01-28	774.27	A	774.03	A	774.20	A
USGS	08091730	2006-01-29	774.25	A	774.22	A	774.23	A
USGS	08091730	2006-01-30	774.24	A	774.20	A	774.22	A
USGS	08091730	2006-01-31	774.24	A	774.20	A	774.22	A
USGS	08091730	2006-02-01	774.22	A	774.20	A	774.21	A
USGS	08091730	2006-02-02	774.24	A	774.21	A	774.22	A
USGS	08091730	2006-02-03	774.24	A	774.20	A	774.22	A
USGS	08091730	2006-02-04	774.23	A	774.19	A	774.21	A
USGS	08091730	2006-02-05	774.21	A	774.15	A	774.20	A
USGS	08091730	2006-02-06	774.21	A	774.12	A	774.16	A
USGS	08091730	2006-02-07	774.17	A	774.13	A	774.15	A
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USGS	08091730	2006-04-04	775.15	A	775.11	A	775.14	A
USGS	08091730	2006-04-05	775.20	A	775.14	A	775.17	A
USGS	08091730	2006-04-06	775.21	A	775.16	A	775.19	A
USGS	08091730	2006-04-07	775.23	A	775.14	A	775.20	A
USGS	08091730	2006-04-08	775.20	A	775.13	A	775.16	A
USGS	08091730	2006-04-09	775.20	A	775.16	A	775.18	A
USGS	08091730	2006-04-10	775.22	A	775.19	A	775.20	A
USGS	08091730	2006-04-11	775.23	A	775.20	A	775.22	A
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USGS	08091730	2006-04-13	775.28	A	775.24	A	775.26	A
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USGS	08091730	2006-04-22	775.45	A	775.43	A	775.44	A
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USGS	08091730	2006-04-24	775.41	A	775.38	A	775.40	A
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USGS	08091730	2006-05-04	775.44	A	775.35	A	775.41	A
USGS	08091730	2006-05-05	775.52	A	775.37	A	775.49	A
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USGS	08091730	2006-05-07	775.61	A	775.57	A	775.59	A
USGS	08091730	2006-05-08	775.57	A	775.53	A	775.56	A
USGS	08091730	2006-05-09	775.54	A	775.50	A	775.53	A
USGS	08091730	2006-05-10	775.53	A	775.45	A	775.50	A
USGS	08091730	2006-05-11	775.46	A	775.40	A	775.43	A
USGS	08091730	2006-05-12	775.42	A	775.38	A	775.40	A
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USGS	08091730	2006-05-18	775.31	A	775.29	A	775.30	A
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USGS	08091730	2006-05-24	775.27	A	775.24	A	775.26	A
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USGS	08091730	2006-05-26	775.29	A	775.26	A	775.27	A
USGS	08091730	2006-05-27	775.28	A	775.24	A	775.26	A
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USGS	08091730	2006-05-31	775.27	A	775.24	A	775.26	A
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USGS	08091730	2006-06-02	775.32	A	775.29	A	775.30	A
USGS	08091730	2006-06-03	775.32	A	775.30	A	775.31	A

USGS	08091730	2006-06-04	775.33	A	775.31	A	775.32	A
USGS	08091730	2006-06-05	775.33	A	775.30	A	775.31	A
USGS	08091730	2006-06-06	775.31	A	775.29	A	775.30	A
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USGS	08091730	2006-06-08	775.32	A	775.29	A	775.30	A
USGS	08091730	2006-06-09	775.32	A	775.30	A	775.31	A
USGS	08091730	2006-06-10	775.31	A	775.29	A	775.30	A
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USGS	08091730	2006-06-15	775.30	A	775.26	A	775.28	A
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USGS	08091730	2006-06-17	775.35	A	775.19	A	775.24	A
USGS	08091730	2006-06-18	775.38	A	775.34	A	775.37	A
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USGS	08091730	2006-06-25	775.38	A	775.33	A	775.35	A
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USGS	08091730	2006-06-29	775.32	A	775.29	A	775.31	A
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USGS	08091730	2006-07-04	775.33	A	775.30	A	775.32	A
USGS	08091730	2006-07-05	775.38	A	775.32	A	775.34	A
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USGS	08091730	2006-07-25	775.23	A	775.17	A	775.21	A
USGS	08091730	2006-07-26	775.21	A	775.17	A	775.20	A
USGS	08091730	2006-07-27	775.19	A	775.14	A	775.16	A
USGS	08091730	2006-07-28	775.15	A	775.12	A	775.14	A
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USGS	08091730	2006-08-03	775.09	A	775.05	A	775.08	A
USGS	08091730	2006-08-04	775.10	A	775.07	A	775.09	A
USGS	08091730	2006-08-05	775.11	A	775.09	A	775.10	A
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USGS	08091730	2006-08-07	775.14	A	775.11	A	775.12	A
USGS	08091730	2006-08-08	775.14	A	775.11	A	775.12	A
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USGS	08091730	2006-08-14	775.13	A	775.10	A	775.12	A
USGS	08091730	2006-08-15	775.15	A	775.12	A	775.13	A
USGS	08091730	2006-08-16	775.15	A	775.12	A	775.13	A
USGS	08091730	2006-08-17	775.15	A	775.12	A	775.13	A
USGS	08091730	2006-08-18	775.15	A	775.12	A	775.13	A
USGS	08091730	2006-08-19	775.15	A	775.11	A	775.14	A
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USGS	08091730	2006-08-21	775.18	A	775.15	A	775.16	A
USGS	08091730	2006-08-22	775.19	A	775.15	A	775.17	A
USGS	08091730	2006-08-23	775.19	A	775.15	A	775.17	A
USGS	08091730	2006-08-24	775.19	A	775.16	A	775.18	A
USGS	08091730	2006-08-25	775.17	A	775.14	A	775.16	A
USGS	08091730	2006-08-26	775.15	A	775.12	A	775.14	A
USGS	08091730	2006-08-27	775.19	A	775.11	A	775.15	A
USGS	08091730	2006-08-28	775.35	A	775.17	A	775.29	A
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USGS	08091730	2006-08-30	775.34	A	775.33	A	775.34	A
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USGS	08091730	2006-09-04	775.35	A	775.31	A	775.33	A
USGS	08091730	2006-09-05	775.36	A	775.34	A	775.35	A
USGS	08091730	2006-09-06	775.35	A	775.32	A	775.34	A
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USGS	08091730	2006-09-08	775.34	A	775.31	A	775.33	A
USGS	08091730	2006-09-09	775.34	A	775.32	A	775.33	A
USGS	08091730	2006-09-10	775.35	A	775.32	A	775.34	A
USGS	08091730	2006-09-11	775.37	A	775.34	A	775.35	A

USGS	08091730	2006-09-12	775.36	A	775.33	A	775.35	A
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USGS	08091730	2006-09-14	775.33	A	775.30	A	775.32	A
USGS	08091730	2006-09-15	775.33	A	775.31	A	775.32	A
USGS	08091730	2006-09-16	775.32	A	775.30	A	775.31	A
USGS	08091730	2006-09-17	775.33	A	775.29	A	775.30	A
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USGS	08091730	2006-09-22	775.28	A	775.23	A	775.25	A
USGS	08091730	2006-09-23	775.26	A	775.22	A	775.24	A
USGS	08091730	2006-09-24	775.24	A	775.20	A	775.22	A
USGS	08091730	2006-09-25	775.22	A	775.19	A	775.21	A
USGS	08091730	2006-09-26	775.24	A	775.21	A	775.23	A
USGS	08091730	2006-09-27	775.25	A	775.22	A	775.24	A
USGS	08091730	2006-09-28	775.25	A	775.21	A	775.23	A
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USGS	08091730	2006-09-30	775.26	A	775.21	A	775.24	A
USGS	08091730	2006-10-01	775.29	A	775.24	A	775.28	A
USGS	08091730	2006-10-02	775.29	A	775.26	A	775.27	A
USGS	08091730	2006-10-03	775.30	A	775.26	A	775.28	A
USGS	08091730	2006-10-04	775.31	A	775.27	A	775.30	A
USGS	08091730	2006-10-05	775.34	A	775.30	A	775.33	A
USGS	08091730	2006-10-06	775.36	A	775.33	A	775.34	A
USGS	08091730	2006-10-07	775.36	A	775.34	A	775.34	A
USGS	08091730	2006-10-08	775.38	A	775.34	A	775.35	A
USGS	08091730	2006-10-09	775.36	A	775.34	A	775.35	A
USGS	08091730	2006-10-10	775.52	A	775.35	A	775.46	A
USGS	08091730	2006-10-11	775.51	A	775.49	A	775.50	A
USGS	08091730	2006-10-12	775.53	A	775.46	A	775.48	A
USGS	08091730	2006-10-13	775.47	A	775.44	A	775.45	A
USGS	08091730	2006-10-14	775.48	A	775.44	A	775.46	A
USGS	08091730	2006-10-15	775.48	A	775.46	A	775.47	A
USGS	08091730	2006-10-16	775.55	A	775.48	A	775.53	A
USGS	08091730	2006-10-17	775.53	A	775.50	A	775.52	A
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USGS	08091730	2006-10-19	775.48	A	775.39	A	775.44	A
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USGS	08091730	2006-10-21	775.42	A	775.37	A	775.40	A
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USGS	08091730	2006-10-25	775.39	A	775.36	A	775.38	A
USGS	08091730	2006-10-26	775.41	A	775.38	A	775.40	A
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USGS	08091730	2006-11-01	775.35	A	775.32	A	775.34	A
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USGS	08091730	2006-11-03	775.33	A	775.31	A	775.32	A
USGS	08091730	2006-11-04	775.33	A	775.30	A	775.32	A
USGS	08091730	2006-11-05	775.35	A	775.31	A	775.33	A
USGS	08091730	2006-11-06	775.43	A	775.34	A	775.41	A
USGS	08091730	2006-11-07	775.44	A	775.42	A	775.43	A
USGS	08091730	2006-11-08	775.44	A	775.41	A	775.43	A
USGS	08091730	2006-11-09	775.45	A	775.42	A	775.44	A
USGS	08091730	2006-11-10	775.45	A	775.40	A	775.43	A
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USGS	08091730	2006-11-15	775.40	A	775.23	A	775.31	A
USGS	08091730	2006-11-16	775.28	A	775.25	A	775.26	A
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USGS	08091730	2006-12-03	775.37	A	775.33	A	775.35	A
USGS	08091730	2006-12-04	775.33	A	775.30	A	775.32	A
USGS	08091730	2006-12-05	775.32	A	775.29	A	775.31	A
USGS	08091730	2006-12-06	775.31	A	775.29	A	775.31	A
USGS	08091730	2006-12-07	775.31	A	775.25	A	775.29	A
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USGS	08091730	2006-12-15	775.28	A	775.26	A	775.27	A
USGS	08091730	2006-12-16	775.29	A	775.26	A	775.27	A
USGS	08091730	2006-12-17	775.29	A	775.26	A	775.28	A
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USGS	08091730	2006-12-19	775.30	A	775.27	A	775.28	A
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USGS	08091730	2006-12-23	775.29	A	775.26	A	775.28	A
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USGS	08091730	2007-01-03	775.42	A	775.33	A	775.35	A
USGS	08091730	2007-01-04	775.48	A	775.41	A	775.46	A
USGS	08091730	2007-01-05	775.48	A	775.46	A	775.47	A
USGS	08091730	2007-01-06	775.48	A	775.44	A	775.46	A
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USGS	08091730	2007-01-08	775.44	A	775.42	A	775.43	A
USGS	08091730	2007-01-09	775.44	A	775.42	A	775.43	A
USGS	08091730	2007-01-10	775.45	A	775.41	A	775.43	A
USGS	08091730	2007-01-11	775.45	A	775.40	A	775.42	A
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USGS	08091730	2007-01-13	775.51	A	775.45	A	775.49	A
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USGS	08091730	2007-01-28	775.27	A	775.17	A	775.23	A
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USGS	08091730	2007-01-30	775.21	A	775.14	A	775.18	A
USGS	08091730	2007-01-31	775.24	A	775.15	A	775.19	A
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USGS	08091730	2007-02-04	775.35	A	775.25	A	775.29	A
USGS	08091730	2007-02-05	775.36	A	775.27	A	775.32	A
USGS	08091730	2007-02-06	775.38	A	775.27	A	775.32	A
USGS	08091730	2007-02-07	775.43	A	775.26	A	775.34	A
USGS	08091730	2007-02-08	775.38	A	775.30	A	775.34	A
USGS	08091730	2007-02-09	775.35	A	775.31	A	775.33	A
USGS	08091730	2007-02-10	775.36	A	775.29	A	775.32	A
USGS	08091730	2007-02-11	775.34	A	775.28	A	775.31	A
USGS	08091730	2007-02-12	775.33	A	775.16	A	775.27	A
USGS	08091730	2007-02-13	775.55	A	775.31	A	775.40	A
USGS	08091730	2007-02-14	775.44	A	775.32	A	775.38	A
USGS	08091730	2007-02-15	775.43	A	775.29	A	775.38	A
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USGS	08091730	2007-02-27	775.40	A	775.10	A	775.27	A
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USGS	08091730	2007-03-02	775.42	A	775.13	A	775.31	A
USGS	08091730	2007-03-03	775.40	A	775.26	A	775.35	A
USGS	08091730	2007-03-04	775.39	A	775.08	A	775.27	A
USGS	08091730	2007-03-05	775.32	A	775.08	A	775.23	A
USGS	08091730	2007-03-06	775.33	A	775.11	A	775.25	A
USGS	08091730	2007-03-07	775.33	A	775.13	A	775.25	A
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USGS	08091730	2007-03-09	775.34	A	775.14	A	775.26	A
USGS	08091730	2007-03-10	775.41	A	775.13	A	775.30	A
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USGS	08091730	2007-03-12	775.41	A	775.21	A	775.33	A
USGS	08091730	2007-03-13	775.39	A	775.20	A	775.32	A
USGS	08091730	2007-03-14	775.39	A	775.19	A	775.27	A
USGS	08091730	2007-03-15	775.43	A	775.18	A	775.34	A
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USGS	08091730	2007-03-21	775.42	A	775.40	A	775.41	A
USGS	08091730	2007-03-22	775.42	A	775.40	A	775.41	A
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USGS	08091730	2007-03-29	775.71	A	775.45	A	775.51	A
USGS	08091730	2007-03-30	776.25	A	775.71	A	775.79	A

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USGS	08091730	2007-04-02	776.11	A	775.97	A	776.03	A
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USGS	08091730	2007-04-04	775.88	A	775.74	A	775.81	A
USGS	08091730	2007-04-05	775.74	A	775.65	A	775.69	A
USGS	08091730	2007-04-06	775.65	A	775.55	A	775.60	A
USGS	08091730	2007-04-07	775.55	A	775.48	A	775.51	A
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USGS	08091730	2007-04-10	775.38	A	775.34	A	775.36	A
USGS	08091730	2007-04-11	775.35	A	775.30	A	775.32	A
USGS	08091730	2007-04-12	775.30	A	775.27	A	775.29	A
USGS	08091730	2007-04-13	775.28	A	775.24	A	775.26	A
USGS	08091730	2007-04-14	775.27	A	775.19	A	775.22	A
USGS	08091730	2007-04-15	775.20	A	775.17	A	775.19	A
USGS	08091730	2007-04-16	775.18	A	775.15	A	775.17	A
USGS	08091730	2007-04-17	775.17	A	775.14	A	775.15	A
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USGS	08091730	2007-04-22	775.11	A	775.09	A	775.11	A
USGS	08091730	2007-04-23	775.14	A	775.11	A	775.12	A
USGS	08091730	2007-04-24	775.31	A	775.12	A	775.20	A
USGS	08091730	2007-04-25	775.32	A	775.29	A	775.30	A
USGS	08091730	2007-04-26	775.31	A	775.29	A	775.30	A
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USGS	08091730	2007-04-28	775.32	A	775.30	A	775.31	A
USGS	08091730	2007-04-29	775.34	A	775.31	A	775.32	A
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USGS	08091730	2007-05-03	776.27	A	776.19	A	776.24	A
USGS	08091730	2007-05-04	776.19	A	776.03	A	776.12	A
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USGS	08091730	2007-05-06	775.89	A	775.79	A	775.84	A
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USGS	08091730	2007-05-08	775.71	A	775.63	A	775.67	A
USGS	08091730	2007-05-09	775.64	A	775.57	A	775.61	A
USGS	08091730	2007-05-10	775.58	A	775.52	A	775.55	A
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USGS	08091730	2007-05-18	775.30	A	775.25	A	775.28	A
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USGS	08091730	2007-05-21	775.16	A	775.11	A	775.13	A
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USGS	08091730	2007-06-07	775.73	A	775.62	A	775.67	A
USGS	08091730	2007-06-08	775.62	A	775.54	A	775.58	A
USGS	08091730	2007-06-09	775.54	A	775.48	A	775.51	A
USGS	08091730	2007-06-10	775.48	A	775.42	A	775.45	A
USGS	08091730	2007-06-11	775.43	A	775.37	A	775.40	A
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USGS	08091730	2007-06-13	775.33	A	775.28	A	775.31	A
USGS	08091730	2007-06-14	775.32	A	775.25	A	775.28	A
USGS	08091730	2007-06-15	775.41	A	775.29	A	775.34	A
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USGS	08091730	2007-06-17	776.13	A	775.45	A	775.81	A
USGS	08091730	2007-06-18	776.14	A	776.05	A	776.11	A
USGS	08091730	2007-06-19	776.05	A	775.91	A	775.98	A
USGS	08091730	2007-06-20	776.01	A	775.87	A	775.96	A
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USGS	08091730	2007-08-24	775.30	A	775.28	A	775.29	A
USGS	08091730	2007-08-25	775.31	A	775.28	A	775.30	A
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USGS	08091730	2007-09-02	775.42	A	775.40	A	775.41	A
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USGS	08091730	2007-09-07	775.53	A	775.51	A	775.52	A
USGS	08091730	2007-09-08	775.51	A	775.50	A	775.51	A
USGS	08091730	2007-09-09	775.51	A	775.49	A	775.50	A
USGS	08091730	2007-09-10	775.51	A	775.49	A	775.50	A
USGS	08091730	2007-09-11	775.51	A	775.46	A	775.48	A
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USGS	08091730	2007-09-13	775.47	A	775.45	A	775.46	A
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USGS	08091730	2007-09-16	775.46	A	775.44	A	775.45	A
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USGS	08091730	2007-09-22	775.41	A	775.39	A	775.40	A
USGS	08091730	2007-09-23	775.41	A	775.40	A	775.41	A
USGS	08091730	2007-09-24	775.41	A	775.39	A	775.40	A
USGS	08091730	2007-09-25	775.40	A	775.39	A	775.39	A
USGS	08091730	2007-09-26	775.41	A	775.39	A	775.40	A
USGS	08091730	2007-09-27	775.42	A	775.39	A	775.41	A
USGS	08091730	2007-09-28	775.41	A	775.40	A	775.41	A
USGS	08091730	2007-09-29	775.40	A	775.38	A	775.39	A
USGS	08091730	2007-09-30	775.38	A	775.37	A	775.38	A
USGS	08091730	2007-10-01	775.40	A	775.37	A	775.39	A
USGS	08091730	2007-10-02	775.40	A	775.39	A	775.39	A
USGS	08091730	2007-10-03	775.44	A	775.38	A	775.42	A
USGS	08091730	2007-10-04	775.44	A	775.42	A	775.43	A

VOLUMETRIC SURVEY OF SQUAW CREEK RESERVOIR

Prepared for:

BRAZOS RIVER AUTHORITY AND TEXAS UTILITIES

Prepared by:

The Texas Water Development Board

March 10, 2003

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SQUAW CREEK RESERVOIR HYDROGRAPHIC SURVEY REPORT

INTRODUCTION

Staff of the Hydrographic Survey Unit of the Texas Water Development Board (TWDB) conducted a hydrographic survey of Squaw Creek Reservoir during the period May 6 - 15, 1997. The purpose of the survey was to determine the capacity of the lake at the conservation pool elevation. In addition, the survey was to determine the amount of water stored behind the mini-dam for emergency purposes in the Squaw Creek Safe Shutdown Impoundment (SSI) facility. From this information, future surveys will be able to determine the location and rates of sediment deposition in the conservation pool over time. Survey results are presented in the following pages in both graphical and tabular form. All elevations presented in this report will be reported in feet above mean sea level based on the National Geodetic Vertical Datum of 1929 (NGVD '29) unless noted otherwise. The conservation pool elevation for Squaw Creek Reservoir is 775.0 feet. The original design information estimates the lake=s original surface area at this elevation to be 3,228 acres and the storage volume to be 151,047 acre-feet of water. The storage volume in the SSI facility was originally estimated at 558 acre feet with an area of 39.8 acres at elevation 775.0.

HISTORY AND GENERAL INFORMATION OF THE RESERVOIR

Squaw Creek Dam and Reservoir are owned by Texas Utilities Electric Company and operated by Texas Utilities Generating Company. The reservoir is located on Squaw Creek in Somervell and Hood Counties, approximately four miles north of Glen Rose (see Figure 1). Records indicate the drainage area is approximately 64 square miles. At the conservation pool elevation, the lake has approximately 36 miles of shoreline and is five miles long. The widest point of the reservoir is approximately two miles (located about 0.40 miles upstream of the dam).

The Texas Water Commission issued Permit No. 2871 on September 11, 1973 to Dallas Power and Light Company, Texas Electric Service Company, Texas Power and Light Company and

Texas Utilities Services, Incorporated, Agent. This original permit authorized the permitees to construct a dam and reservoir on Squaw Creek having an impoundment capacity of 151,500 acre-feet of water. Permitees were also granted the right to construct a dam and reservoir (mini-reservoir) on Panther Branch. The impoundment of this mini-reservoir was not to exceed 367 acre-feet of water and was to be included in the total capacity of 151,500 acre-feet of water in the main reservoir. Permitees were authorized to maintain the reservoirs with available waters from Squaw Creek and to divert supplemental water from Lake Granbury. The permitees were authorized to divert, circulate and recirculate water and to use consumptively, not to exceed, 20,780 acre-feet of water annually for industrial (condenser cooling) purposes. Authorization was granted to divert and use 2,400 acre-feet of water annually for ancillary purposes in the operation of the permitees= nuclear-fueled electric power generating plant. The permit was amended several times since it was granted. In November of 1982, the permitees, Dallas Power and Light Co., Texas Electric Service Co., and Texas Power and Light Co., merged into Texas Utilities Electric Co. In February of 1986, Certificate of Adjudication No. 12-4097 was issued by the Texas Water Commission. The certificate re-affirms the rights of Texas Utilities Electric Co. regarding the impoundment capacities and water uses stated in Permit 2871 for Squaw Creek Reservoir.

Records indicate the construction for Squaw Creek Dam began on November 17, 1974 and was completed on June 16, 1977. Freese and Nichols Consulting Engineers of Fort Worth designed the facility and Brown and Root, Inc., managed the construction project. Squaw Creek Dam and appurtenant structures consist of an earthfill embankment 4,360 feet in length with a maximum height of 159 feet and a crest elevation of 796.0 feet. The service spillway is an uncontrolled concrete ogee type located between the right (southwest) end of the embankment and abutment. The crest of the spillway is 100 feet in width at elevation 775.0 feet. The emergency spillway is an earthcut channel through bedrock located at the left abutment, northeast of the embankment. The width of the channel is 2,200 feet with a crest elevation of 783.0 feet. The service outlet structure consists of a concrete tower housing three gate-controlled outlets with invert elevations of 764.0 feet, 715.0 feet and 666.5 feet. The 30 inch diameter low-flow outlet has an invert elevation of 653.0 feet. All discharges from the outlet tower pass through a six foot diameter concrete encased conduit and are released downstream of the embankment.

Contained within Squaw Creek Reservoir, is a smaller reservoir. The smaller reservoir is designed to provide cooling water during an emergency situation to safely shutdown the Comanche Peak Steam Electric Station. This facility will be referred to as the mini-dam and the Squaw Creek Safe Shutdown Impoundment (SSI) facility. The mini-dam is located on Panther Branch, a tributary of Squaw Creek. The dam is composed of an earthfill embankment, approximately 1,520 feet in length. The maximum height of the embankment is 70 feet above the natural streambed. The 40 feet wide crest is at elevation 796.0 feet. The service/emergency spillway is a 40 feet wide by 400 feet long earthcut channel connecting the SSI facility to the main reservoir. This ingress/egress channel, located to the right (south) of the mini-dam, is also referred to as the equalization channel for the two reservoirs. The flow of water between the two reservoirs is controlled by a three feet tall by three feet wide concrete weir that extends the width of the channel with a flowline elevation of 769.5 feet.

HYDROGRAPHIC SURVEYING TECHNOLOGY

The following sections will describe the theory behind Global Positioning System (GPS) technology and its accuracy. Equipment and methodology used to conduct the subject survey and previous hydrographic surveys are also addressed.

GPS Information

The following is a brief and simple description of Global Positioning System (GPS) technology. GPS is a relatively new technology that uses a network of satellites, maintained in precise orbits around the earth, to determine locations on the surface of the earth. GPS receivers continuously monitor the broadcasts from the satellites to determine the position of the receiver. With only one satellite being monitored, the point in question could be located anywhere on a sphere surrounding the satellite with a radius of the distance measured. The observation of two satellites decreases the possible location to a finite number of points on a circle where the two spheres intersect. With a third satellite observation, the unknown location is reduced to two points where all three spheres intersect. One of these points is obviously in error because its location is in space, and it is ignored. Although

three satellite measurements can fairly accurately locate a point on the earth, the minimum number of satellites required to determine a three dimensional position within the required accuracy is four. The fourth measurement compensates for any time discrepancies between the clock on board the satellites and the clock within the GPS receiver.

GPS technology was developed in the 1960's by the United States Air Force and the defense establishment. After program funding in the early 1970's, the initial satellite was launched on February 22, 1978. A four year delay in the launching program occurred after the Challenger space shuttle disaster. In 1989, the launch schedule was resumed. Full operational capability was reached on April 27, 1995 when the NAVSTAR (NAVigation System with Time And Ranging) satellite constellation was composed of 24 Block II satellites. Initial operational capability, a full constellation of 24 satellites, in a combination of Block I (prototype) and Block II satellites, was achieved December 8, 1993. The NAVSTAR satellites provide data based on the World Geodetic System (WGS '84) spherical datum. WGS '84 is essentially identical to the 1983 North American Datum (NAD '83).

The United States Department of Defense (DOD) is currently responsible for implementing and maintaining the satellite constellation. In an attempt to discourage the use of these survey units as a guidance tool by hostile forces, the DOD has implemented means of false signal projection called Selective Availability (S/A). Positions determined by a single receiver when S/A is active result in errors to the actual position of up to 100 meters. These errors can be reduced to centimeters by performing a static survey with two GPS receivers, one of which is set over a point with known coordinates. The errors induced by S/A are time-constant. By monitoring the movements of the satellites over time (one to three hours), the errors can be minimized during post processing of the collected data and the unknown position computed accurately.

Differential GPS (DGPS) can determine positions of moving objects in real-time or "on-the-fly." In the early stages of this program, one GPS receiver was set up over a benchmark with known coordinates established by the hydrographic survey crew. This receiver remained stationary during the survey and monitored the movements of the satellites overhead. Position corrections were determined and transmitted via a radio link once per second to another GPS receiver located on the

moving boat. The boat receiver used these corrections, or differences, in combination with the satellite information it received to determine its differential location. The large positional errors experienced by a single receiver when S/A is active are greatly reduced by utilizing DGPS. The reference receiver calculates satellite corrections based on its known fixed position, which results in positional accuracies within three meters for the moving receiver. DGPS was used to determine horizontal position only. Vertical information was supplied by the depth sounder.

The need for setting up a stationary shore receiver for current surveys has been eliminated with the development of fee-based reference position networks. These networks use a small network of GPS receivers to create differential corrections for a large network of transmitting stations, Wide Area Differential GPS (WADGPS). The TWDB receives this service from ACCQPOINT, a WADGPS correction network over a FM radio broadcast. A small radio receiver purchased from ACCQPOINT, collects positional correction information from the closest broadcast station and provides the data to the GPS receiver on board the hydrographic surveying boat to allow the position to be differentially corrected.

Equipment and Methodology

The equipment used in the performance of the hydrographic survey consisted of a 23-foot aluminum tri-hull SeaArk craft with cabin, equipped with twin 90-Horsepower Johnson outboard motors. Installed within the enclosed cabin are an Innerspace Helmsman Display (for navigation), an Innerspace Technology Model 449 Depth Sounder and Model 443 Velocity Profiler, a Trimble Navigation, Inc. 4000SE GPS receiver, an ACCQPOINT FM receiver, and an on-board 486 computer. Power was provided by a water-cooled generator through an in-line uninterruptible power supply. Reference to brand names does not imply endorsement by the TWDB.

The GPS equipment, survey vessel, and depth sounder combine together to provide an efficient hydrographic survey system. As the boat travels across the lake surface, the depth sounder gathers approximately ten readings of the lake bottom each second. The depth readings are stored on the survey vessel's on-board computer along with the corrected positional data generated by the boat's GPS receiver. The daily data files collected are downloaded from the computer and brought to the

office for editing after the survey is completed. During editing, bad data is removed or corrected, multiple data points are averaged to get one data point per second, and average depths are converted to elevation readings based on the daily recorded lake elevation on the day the survey was performed. Accurate estimates of the lake volume can be quickly determined by building a 3-D model of the reservoir from the collected data. The level of accuracy is equivalent to or better than previous methods used to determine lake volumes, some of which are discussed below.

Previous Survey Procedures

Originally, reservoir surveys were conducted with a rope stretched across the reservoir along pre-determined range lines. A small boat would manually pole the depth at selected intervals along the rope. Over time, aircraft cable replaced the rope and electronic depth sounders replaced the pole. The boat was hooked to the cable, and depths were again recorded at selected intervals. This method, used mainly by the Soil Conservation Service, worked well for small reservoirs.

Larger bodies of water required more involved means to accomplish the survey, mainly due to increased size. Cables could not be stretched across the body of water, so surveying instruments were utilized to determine the path of the boat. Monumentation was set for the end points of each line so the same lines could be used on subsequent surveys. Prior to a survey, each end point had to be located (and sometimes reestablished) in the field and vegetation cleared so that line of sight could be maintained. One surveyor monitored the path of the boat and issued commands via radio to insure that it remained on line while a second surveyor determined depth measurement locations by turning angles. Since it took a major effort to determine each of the points along the line, the depth readings were spaced quite a distance apart. Another major cost was the land surveying required prior to the reservoir survey to locate the range line monuments and clear vegetation.

Electronic positioning systems were the next improvement. If triangulation could determine the boat location by electronic means, then the boat could take continuous depth soundings. A set of microwave transmitters positioned around the lake at known coordinates would allow the boat to receive data and calculate its position. Line of site was required, and the configuration of the transmitters had to be such that the boat remained within the angles of 30 and 150 degrees with respect

to the shore stations. The maximum range of most of these systems was about 20 miles. Each shore station had to be accurately located by survey, and the location monumented for future use. Any errors in the land surveying resulted in significant errors that were difficult to detect. Large reservoirs required multiple shore stations and a crew to move the shore stations to the next location as the survey progressed. Land surveying remained a major cost with this method.

More recently, aerial photography has been used prior to construction, to generate elevation contours from which to calculate the volume of the reservoir. Fairly accurate results could be obtained, although the vertical accuracy of the aerial topography was generally one-half of the contour interval or ± five feet for a ten-foot contour interval. This method could be quite costly and was only applicable in areas that were not inundated.

PRE-SURVEY PROCEDURES

The reservoir's surface area was determined prior to the survey by digitizing with AutoCad software the lake's pool boundary (elevation 775.0) from a Jones and Boyd, Inc., 1" = 1,000 feet, work map of the newly formed reservoir and 1987 sedimentation range lines. The work map was created from 7.5 minute USGS quadrangle maps, ANemo,≅ and AHill City.≅ The graphic boundary file created was then transformed into the proper datum, from NAD '27 datum to NAD '83, using Environmental Systems Research Institutes's (ESRI) Arc/Info project command with the NADCOM (standard conversion method within the United States) parameters. The area of the lake boundary was checked to verify that the area was the same in both datums.

The survey layout was designed by placing survey track lines at 500 foot intervals across the lake. The survey design for this lake required approximately 150 survey lines to be placed along the length of the lake. Survey setup files were created using Coastal Oceangraphics, Inc. Hypack software for each group of track lines that represented a specific section of the lake. The setup files were copied onto diskettes for use during the field survey.

SURVEY PROCEDURES

The following procedures were followed during the hydrographic survey of Squaw Creek Reservoir performed by the TWDB. Information regarding equipment calibration and operation, the field survey, and data processing is presented.

Equipment Calibration and Operation

At the beginning of each surveying day, the depth sounder was calibrated with the Innerspace Velocity Profiler. The Velocity Profiler calculates an average speed of sound through the water column of interest for a designated draft value of the boat (draft is the vertical distance that the boat penetrates the water surface). The draft of the boat was previously determined to average 1.2 ft. The velocity profiler probe is placed in the water to moisten and acclimate the probe. The probe is then raised to the water surface where the depth is zeroed. The probe is lowered on a cable to just below the maximum depth set for the water column, and then raised to the surface. The unit displays an average speed of sound for a given water depth and draft, which is entered into the depth sounder. The depth value on the depth sounder was then checked manually with a measuring tape to ensure that the depth sounder was properly calibrated and operating correctly. During the survey of Squaw Creek Reservoir, the speed of sound in the water column varied daily between 4806 and 4966 feet per second. Based on the measured speed of sound for various depths, and the average speed of sound calculated for the entire water column, the depth sounder is accurate to within ± 0.2 feet, plus an estimated error of ± 0.3 feet due to the plane of the boat for a total accuracy of ± 0.5 feet for any instantaneous reading. These errors tend to be minimized over the entire survey, since some are positive readings and some are negative readings. Further information on these calculations is presented in Appendix A.

During the survey, the onboard GPS receiver was set to a horizontal mask of 10° and a PDOP (Position Dilution of Precision) limit of 7 to maximize the accuracy of horizontal positions. An internal alarm sounds if the PDOP rises above seven to advise the field crew that the horizontal position has degraded to an unacceptable level. The lake=s initialization file used by the Hypack data collection program was setup to convert the collected DGPS positions on-the-fly to state plane

coordinates. Both sets of coordinates were then stored in the survey data file.

Field Survey

Data were collected at Squaw Creek Reservoir during the period of May 6 through May 15, 1997. Weather conditions were excellent with moderate temperatures and mild winds. Approximately 63,375 data points were collected over the 102 miles traveled along the pre-planned survey lines and the random data-collection lines. (Note: On October 9, 1997, 6,429 additional points were collected to clarify a questionable area within the lake.) These points were stored digitally on the boat's computer in 188 data files. Data were not collected in areas of shallow water (depths less than 3.0 feet) or with significant obstructions unless these areas represented a large amount of water. Random data lines were also collected parallel to the original stream bed in the main body of the lake. Extra data were collected in the SSI facility and on both sides of the mini-dam. Figure 2 shows the actual location of all data collection points.

TWDB staff observed many different distinct features above and below the water during the field survey. The land surface around the lake was generally rolling hills with some limestone cliffs along various portions of the south bank. Below the water, a rapid drop off of the lake bottom occurred to a depth of around 105 feet, as the boat traveled from south to north across the lake near the dam. The bottom was then fairly level as the boat traveled across the old river flood plain. Within this flood plain, the original river and creek channels were easily distinguishable on the depth sounder chart when they were crossed. Also noted within this flood plain, from the dam upstream about 1.5 miles to the power plant, were various borrow pits with water depths of over 125 feet. A steady upward slope occurred as the boat approached the north side of the lake, but the slope was not as severe as on the south side.

Navigational hazards such as standing trees, brush, submerged trees and stumps were encountered mostly upstream of Squaw Creek Park. Sediment deposits and aquatic vegetation were observed mainly in the upper reaches of the lake. The crew was able to collect data in these areas, but at a much slower pace. Data collection in the headwaters were discontinued when the boat could no longer cross the lake due to shallow water and extensive vegetation. The collected data were

stored in individual data files for each pre-plotted range line or random data collection event. These files were downloaded to diskettes at the end of each day for future processing.

Data Processing

The collected data were down-loaded from diskettes onto the TWDB's computer network. Tape backups were made for future reference as needed. To process the data, the EDIT routine in the Hypack Program was run on each raw data file. Data points such as depth spikes or data with missing depth or positional information were deleted from the file. The depth information collected every 0.1 seconds was averaged to get one reading for each second of data collection. A correction for the lake elevation at the time of data collection was also applied to each file during the EDIT routine. During the survey, the water surface varied between 775.02 and 775.62 feet. After all changes had been made to the raw data file, the edited file was saved with a different extension. The edited files were combined into a single X,Y,Z data file, representative of the lake, to be used with the GIS software to develop a model of the lake's bottom surface.

The resulting data file was imported into the UNIX operating system used to run Environmental System Research Institutes's (ESRI) Arc/Info GIS software and converted to a MASS points file. The MASS points and the boundary file were then used to create a Digital Terrain Model (DTM) of the reservoir's bottom surface using Arc/Info's TIN software module. The module builds an irregular triangulated network from the data points and the boundary file. This software uses a method known as Delauney's criteria for triangulation. A triangle is formed between three non-uniformly spaced points, including all points along the boundary. If there is another point within the triangle, additional triangles are created until all points lie on the vertex of a triangle. All of the data points are preserved for use in determining the solution of the model by using this method. The generated network of three-dimensional triangular planes represents the actual bottom surface. Once the triangulated irregular network (TIN) is formed, the software then calculates elevations along the triangle surface plane by solving the equations for elevation along each leg of the triangle. Information for the entire reservoir area can be determined from the triangulated irregular network created using this method of interpolation.

If data points were collected outside the boundary file, the boundary was modified to include the data points. The boundary file in areas of significant sedimentation was also down-sized as deemed necessary based on the data points and the observations of the field crew. The resulting boundary shape was used to develop each of the map presentations of the lake in this report.

There were some areas where volume and area values could not be calculated by interpolation because of a lack of information within the reservoir. "Flat triangles" were drawn at these locations. Arc/Info does not use flat triangle areas in the volume or contouring features of the model. A review of these areas determined them to be insignificant on Squaw Creek Reservoir. Therefore no additional points were required to be added to the data file for interpolation and contouring of the entire lake surface. Volumes and areas were calculated from the TIN for the entire reservoir at one-tenth of a foot intervals. The area of lake computed from the TIN, was calculated to be 3,297 surface acres. The computed area was 69 surface acres more than originally calculated in 1977. The computed reservoir volume table is presented in Appendix B and the area table in Appendix C. An elevation-area-volume graph is presented in Appendix D.

Other presentations developed from the model include a shaded relief map and a shaded depth range map. To develop these maps, the TIN was converted to a lattice using the TINLATTICE command and then to a polygon coverage using the LATTICEPOLY command. Using the POLYSHADE command, colors were assigned to the range of elevations represented by the polygons that varied from navy to yellow. The lower elevation was assigned the color of navy, and the 775.0 lake elevation was assigned the color of yellow. Different color shades were assigned to the intermediate depths. Figure 3 presents the resulting depth shaded representation of the lake. Figure 4 presents a similar version of the same map, using bands of color for selected depth intervals. The color increases in intensity from the shallow contour bands to the deep water bands.

Linear filtration algorithms were then applied to the DTM smooth cartographic contours versus using the sharp engineered contours. The resulting contour map of the bottom surface at two-foot intervals is presented in Figure 5.

RESULTS

Results from the 1997 TWDB survey indicate Squaw Creek Reservoir encompasses 3,297 surface acres and contains a volume of 151,418 acre-feet at the conservation pool elevation of 775.0 feet. The shoreline at this elevation was calculated to be 36.14 miles. The deepest point of the lake, elevation 644.69 or 130.31 feet of depth, was located approximately 3,350 feet upstream from the center of the dam. The dead storage volume, or the amount of water below the lowest outlet in the dam, was calculated to be 51 acre-feet based on the low flow outlet invert elevation of 653.0 feet. The conservation storage capacity, or the amount of water between the spillway and the lowest outlet, is therefore calculated to be, 151,370 acre-feet.

Results of the survey of the mini-dam and SSI facility indicate that at elevation 775.0, the surface area is 53 acres and the storage capacity is 701 acre-feet.

SUMMARY

Squaw Creek Reservoir was formed in 1977. Initial storage calculations estimated the volume at the conservation pool elevation of 775.0 feet to be 151,047 acre-feet with a surface area of 3,228 acres.

A sedimentation survey was performed in 1987 by Jones and Boyd, Inc., Consulting Engineers. Results from the survey indicated that the surface area of the lake was 3,189 acres, and the storage volume had decreased to 150,569 acre-feet.

During the period of May 6 - 15, 1997, a hydrographic survey of Squaw Creek Reservoir was performed by the Texas Water Development Board's Hydrographic Survey Program. The 1997 survey used technological advances such as differential global positioning system and geographical information system technology to build a model of the reservoir's bathemetry. These advances allowed a survey to be performed quickly and to collect significantly more data of the bathemetry of Squaw Creek Reservoir than previous survey methods. Results indicate that the lake's capacity at the

conservation pool elevation of 775.0 feet was 151,418 acre-feet and the area was 3,297 acres. Within the lake, the survey determined that the Squaw Creek Safe Shutdown Impoundment held 701 acre-feet, spread over a surface area of 53 acres. The total capacity of Squaw Creek Reservoir was slightly higher (849 acre-feet) than was determined by the 1987 sedimentation survey. This slight difference can be attributed to the amount of data collected by each survey. The 1987 survey collected data on 25 survey lines across the lake, while the 1997 survey collected data across 150 survey lines. The increased coverage of the 1997 survey made a significant change to the overall bottom profile of the lake versus the profile determined by the 1987 survey. While no estimates of sedimentation or sedimentation rates can be made from the two surveys due to the differences of each survey, the TWDB considers the 1997 survey to be a significant improvement over previous survey procedures and recommends that the same methodology be used in five to ten years or after major flood events to monitor changes to the lake's storage capacity.

CALCULATION OF DEPTH SOUNDER ACCURACY

This methodology was extracted from the Innerspace Technology, Inc. Operation Manual for the Model 443 Velocity Profiler.

For the following examples, $t = (D - d)/V$

where: t_D = travel time of the sound pulse, in seconds (at depth = D)
D = depth, in feet
d = draft = 1.2 feet
V = speed of sound, in feet per second

To calculate the error of a measurement based on differences in the actual versus average speed of sound, the same equation is used, in this format:

$$D = [t(V)]+d$$

For the water column from 2 to 30 feet: V = 4832 fps

$t_{30} = (30-1.2)/4832$
$= 0.00596$ sec.

For the water column from 2 to 45 feet: V = 4808 fps

$t_{45} = (45-1.2)/4808$
$= 0.00911$ sec.

For a measurement at 20 feet (within the 2 to 30 foot column with V = 4832 fps):

$D_{20} = [((20-1.2)/4832)(4808)]+1.2$
$= 19.9'$ (-0.1')

For a measurement at 30 feet (within the 2 to 30 foot column with V = 4832 fps):

$D_{30} = [((30-1.2)/4832)(4808)]+1.2$
$= 29.9'$ (-0.1')

For a measurement at 50 feet (within the 2 to 60 foot column with V = 4799 fps):

$D_{50} = [((50-1.2)/4799)(4808)]+1.2$
$= 50.1'$ (+0.1')

For the water column from 2 to 60 feet: V = 4799 fps Assumed V_{80} = 4785 fps

t_{60} =(60-1.2)/4799
=0.01225 sec.

For a measurement at 10 feet (within the 2 to 30 foot column with V = 4832 fps):

D_{10} = [((10-1.2)/4832)(4799)]+1.2
= 9.9' (-0.1')

For a measurement at 30 feet (within the 2 to 30 foot column with V = 4832 fps):

D_{30} = [((30-1.2)/4832)(4799)]+1.2
= 29.8' (-0.2')

For a measurement at 45 feet (within the 2 to 45 foot column with V = 4808 fps):

D_{45} = [((45-1.2)/4808)(4799)]+1.2
= 44.9' (-0.1')

For a measurement at 80 feet (outside the 2 to 60 foot column, assumed V = 4785 fps):

D_{80} = [((80-1.2)/4785)(4799)]+1.2
= 80.2' (+0.2')

TEXAS WATER DEVELOPMENT BOARD
RESERVOIR VOLUME TABLE

Oct 14 1997

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

VOLUME IN ACRE-FEET ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
644										
645										
646										
647										
648				1	1	1	1	1	1	2
649	2	2	3	3	4	4	5	6	7	8
650	9	10	11	12	13	14	15	17	18	19
651	20	21	23	24	25	27	28	30	31	32
652	34	35	37	39	40	42	44	46	48	50
653	51	53	56	58	60	62	64	66	68	70
654	73	75	77	79	82	84	86	89	91	93
655	96	98	101	103	106	108	111	113	116	118
656	121	124	126	129	131	134	137	140	142	145
657	148	151	154	157	160	163	166	169	173	176
658	179	183	186	190	194	197	201	205	209	213
659	217	221	225	229	234	238	243	247	252	257
660	262	267	272	277	282	288	293	299	305	310
661	316	322	329	335	341	348	354	361	368	375
662	382	390	397	405	413	420	429	437	445	453
663	462	471	480	489	498	507	517	527	536	546
664	557	567	577	588	599	610	621	632	644	655
665	667	679	691	704	716	729	742	755	768	781
666	795	809	823	837	851	866	881	896	911	926
667	942	958	974	990	1006	1023	1040	1057	1074	1092
668	1110	1127	1146	1164	1183	1201	1221	1240	1259	1279
669	1299	1319	1340	1360	1381	1402	1424	1445	1467	1489
670	1511	1533	1556	1579	1602	1625	1648	1672	1696	1720
671	1744	1769	1793	1818	1843	1868	1893	1919	1945	1971
672	1997	2023	2049	2076	2102	2129	2156	2184	2211	2239
673	2266	2294	2322	2350	2379	2407	2436	2465	2494	2523
674	2553	2582	2612	2642	2672	2702	2733	2763	2794	2825
675	2856	2887	2919	2950	2982	3014	3046	3079	3111	3144
676	3176	3209	3242	3275	3309	3342	3376	3409	3443	3477
677	3511	3546	3580	3615	3649	3684	3719	3754	3789	3825
678	3860	3896	3932	3968	4004	4040	4076	4113	4149	4186
679	4223	4261	4298	4335	4373	4411	4449	4487	4525	4563
680	4602	4640	4679	4718	4757	4796	4835	4874	4914	4954
681	4993	5033	5073	5114	5154	5195	5235	5276	5317	5358
682	5399	5440	5482	5523	5565	5607	5649	5691	5733	5775
683	5818	5860	5903	5946	5989	6032	6075	6119	6162	6206
684	6250	6294	6338	6382	6426	6471	6516	6560	6605	6650
685	6696	6741	6787	6832	6878	6924	6971	7017	7064	7111
686	7158	7205	7252	7300	7348	7395	7443	7491	7540	7588
687	7637	7685	7734	7783	7832	7882	7931	7981	8031	8081
688	8131	8181	8231	8282	8333	8384	8435	8486	8537	8589
689	8640	8692	8744	8796	8849	8901	8954	9007	9060	9113
690	9167	9220	9274	9328	9383	9437	9492	9546	9601	9656
691	9712	9767	9823	9879	9935	9991	10047	10104	10161	10218
692	10275	10332	10390	10447	10505	10563	10621	10679	10737	10796

RESERVOIR VOLUME TABLE

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

VOLUME IN ACRE-FEET ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
693	10855	10913	10972	11032	11091	11150	11210	11270	11330	11390
694	11451	11511	11572	11633	11694	11755	11817	11879	11941	12003
695	12065	12127	12190	12253	12316	12379	12442	12506	12569	12633
696	12697	12761	12826	12890	12955	13020	13085	13150	13216	13281
697	13347	13413	13480	13546	13613	13680	13747	13814	13881	13949
698	14017	14085	14154	14222	14291	14360	14429	14498	14568	14638
699	14708	14778	14849	14919	14990	15062	15133	15205	15276	15348
700	15421	15493	15566	15639	15713	15786	15860	15934	16009	16083
701	16158	16234	16309	16385	16461	16538	16615	16692	16769	16846
702	16924	17002	17081	17159	17238	17317	17396	17475	17555	17635
703	17715	17795	17876	17956	18037	18119	18200	18282	18364	18446
704	18528	18611	18694	18777	18860	18943	19027	19111	19195	19280
705	19364	19449	19534	19619	19705	19791	19877	19963	20049	20136
706	20223	20310	20397	20485	20573	20661	20749	20838	20926	21015
707	21105	21194	21284	21374	21464	21555	21645	21736	21828	21919
708	22011	22103	22195	22287	22380	22473	22566	22660	22753	22847
709	22942	23036	23131	23226	23321	23417	23513	23609	23705	23802
710	23898	23995	24092	24190	24288	24385	24483	24582	24680	24779
711	24878	24977	25077	25176	25276	25376	25476	25576	25677	25778
712	25879	25980	26081	26183	26285	26387	26489	26592	26694	26797
713	26901	27004	27108	27211	27316	27420	27524	27629	27734	27839
714	27945	28050	28156	28262	28368	28475	28581	28688	28795	28903
715	29010	29118	29226	29334	29443	29551	29660	29769	29879	29988
716	30098	30208	30318	30429	30540	30651	30762	30873	30985	31097
717	31209	31321	31433	31546	31659	31772	31886	32000	32114	32228
718	32342	32457	32572	32687	32803	32918	33034	33151	33267	33384
719	33500	33618	33735	33853	33970	34088	34207	34325	34444	34563
720	34682	34802	34921	35041	35162	35282	35403	35524	35645	35767
721	35888	36011	36133	36256	36379	36502	36625	36749	36873	36997
722	37122	37247	37372	37497	37623	37749	37875	38002	38129	38256
723	38383	38511	38639	38767	38896	39024	39153	39283	39412	39542
724	39672	39802	39933	40064	40195	40327	40459	40591	40723	40856
725	40989	41122	41256	41390	41524	41658	41793	41928	42064	42200
726	42336	42472	42609	42746	42884	43021	43159	43298	43436	43575
727	43715	43854	43994	44135	44276	44417	44558	44700	44841	44984
728	45126	45269	45412	45556	45700	45844	45988	46133	46278	46423
729	46569	46715	46862	47008	47155	47303	47450	47598	47747	47895
730	48044	48194	48343	48494	48644	48795	48946	49098	49250	49402
731	49555	49708	49861	50015	50169	50324	50479	50634	50790	50946
732	51103	51260	51417	51574	51732	51891	52049	52208	52368	52527
733	52687	52848	53009	53170	53331	53493	53655	53818	53980	54144
734	54307	54471	54635	54800	54965	55130	55296	55462	55628	55795
735	55962	56129	56296	56464	56633	56801	56970	57139	57309	57479
736	57649	57819	57990	58161	58332	58504	58676	58849	59021	59194
737	59368	59541	59715	59889	60064	60239	60414	60589	60765	60941
738	61118	61294	61471	61648	61826	62004	62182	62361	62540	62719
739	62899	63078	63259	63439	63620	63801	63982	64164	64346	64529
740	64712	64895	65078	65262	65446	65630	65814	65999	66184	66370
741	66556	66742	66929	67116	67303	67490	67678	67866	68055	68244
742	68433	68622	68812	69002	69193	69384	69575	69766	69958	70150

RESERVOIR VOLUME TABLE

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

VOLUME IN ACRE-FEET ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
743	70343	70535	70729	70922	71116	71310	71505	71699	71895	72090
744	72286	72482	72679	72876	73073	73270	73468	73666	73865	74064
745	74263	74462	74662	74862	75063	75264	75465	75666	75868	76070
746	76272	76475	76678	76882	77085	77289	77494	77699	77904	78109
747	78315	78521	78727	78934	79141	79348	79556	79764	79972	80181
748	80390	80599	80809	81019	81229	81440	81651	81862	82074	82286
749	82498	82710	82923	83137	83350	83564	83778	83993	84207	84423
750	84638	84854	85070	85287	85504	85721	85938	86156	86375	86594
751	86813	87032	87252	87472	87693	87914	88135	88356	88578	88801
752	89024	89247	89471	89695	89919	90144	90369	90595	90821	91047
753	91274	91501	91728	91956	92185	92413	92642	92872	93102	93332
754	93562	93793	94024	94256	94488	94721	94953	95187	95420	95654
755	95888	96123	96358	96594	96830	97066	97302	97540	97777	98015
756	98253	98492	98731	98970	99210	99450	99691	99932	100173	100415
757	100657	100899	101142	101386	101629	101873	102118	102363	102608	102854
758	103100	103346	103593	103840	104088	104336	104584	104833	105082	105332
759	105582	105833	106084	106335	106586	106839	107091	107344	107597	107851
760	108106	108360	108615	108871	109127	109383	109640	109897	110155	110413
761	110672	110930	111190	111450	111710	111970	112231	112493	112755	113017
762	113280	113543	113807	114071	114336	114601	114866	115132	115398	115665
763	115932	116199	116467	116735	117004	117273	117543	117813	118083	118354
764	118626	118897	119170	119442	119715	119989	120263	120537	120812	121087
765	121363	121639	121915	122192	122470	122747	123026	123304	123584	123863
766	124143	124424	124705	124987	125269	125551	125834	126117	126401	126686
767	126971	127256	127542	127828	128115	128403	128690	128979	129268	129557
768	129847	130138	130429	130720	131012	131305	131598	131891	132185	132480
769	132775	133070	133366	133663	133960	134257	134555	134854	135152	135452
770	135752	136052	136353	136655	136957	137259	137562	137866	138170	138474
771	138779	139088	139394	139700	140008	140315	140624	140932	141242	141552
772	141862	142173	142484	142797	143109	143422	143736	144050	144365	144680
773	144996	145312	145629	145946	146264	146582	146901	147220	147540	147860
774	148181	148502	148824	149147	149469	149793	150117	150441	150766	151092
775	151418									

TEXAS WATER DEVELOPMENT BOARD
RESERVOIR AREA TABLE

Oct 14 1997

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

AREA IN ACRES ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
644										
645										
646										
647										
648		1	1	1	1	1	2	2	2	3
649	3	4	4	5	6	7	7	8	9	10
650	11	11	11	11	11	12	12	12	12	12
651	12	13	13	13	13	14	14	14	15	15
652	15	16	16	16	17	18	18	19	19	19
653	20	20	20	21	21	21	21	22	22	22
654	22	22	23	23	23	23	23	24	24	24
655	24	24	25	25	25	25	25	25	26	26
656	26	26	26	27	27	27	27	28	28	28
657	29	29	29	30	30	31	32	32	33	34
658	34	35	36	36	37	37	38	39	39	40
659	41	41	42	43	44	45	46	47	48	49
660	50	51	52	53	54	55	56	57	58	59
661	60	61	62	64	65	66	67	69	70	71
662	73	74	75	77	78	80	81	82	84	85
663	87	88	90	91	93	95	96	98	99	101
664	102	104	106	107	109	111	112	114	115	117
665	119	121	122	124	126	128	130	131	133	135
666	137	139	141	143	145	147	149	151	153	155
667	157	159	161	163	165	168	170	172	174	176
668	178	180	183	185	187	189	192	194	196	199
669	201	203	206	208	210	212	214	216	219	221
670	223	225	227	229	231	233	235	237	239	241
671	243	245	247	249	251	253	254	256	258	260
672	261	263	264	266	268	270	271	273	275	277
673	278	280	281	283	285	286	288	290	291	293
674	295	297	298	300	302	303	305	307	308	310
675	312	314	315	317	319	320	322	323	325	326
676	328	329	331	332	334	335	337	338	339	341
677	342	343	345	346	348	349	350	352	353	354
678	356	357	359	360	362	363	365	366	368	370
679	371	373	374	375	377	378	380	381	382	384
680	385	386	388	389	390	392	393	395	396	398
681	399	400	402	403	404	406	407	408	410	411
682	412	414	415	416	417	419	420	421	423	424
683	425	427	428	429	431	432	433	435	436	438
684	439	440	442	443	444	446	447	449	450	452
685	453	455	456	458	460	462	464	466	468	470
686	471	473	474	476	477	479	480	482	483	485
687	486	488	489	491	492	494	496	497	499	500
688	502	504	505	507	508	510	511	513	514	516
689	518	520	521	523	525	526	528	530	532	534
690	535	537	539	541	543	545	547	549	551	552
691	554	556	558	559	561	563	565	567	569	570
692	572	573	575	577	578	580	581	583	584	586

RESERVOIR AREA TABLE

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

AREA IN ACRES ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
693	588	589	591	592	594	596	598	599	601	603
694	605	607	609	611	612	614	616	618	620	622
695	623	625	627	629	630	632	634	636	637	639
696	641	643	644	646	648	650	652	654	656	658
697	660	662	664	666	668	670	672	674	676	678
698	680	682	684	687	689	691	693	695	697	699
699	702	704	706	708	710	713	715	717	720	722
700	724	727	729	732	735	737	740	743	746	749
701	752	755	758	761	763	766	769	771	774	777
702	779	782	784	786	788	791	793	795	797	799
703	802	804	806	809	811	814	816	818	820	823
704	825	827	829	832	834	836	838	841	843	845
705	847	849	852	854	856	858	860	863	865	868
706	870	872	875	877	880	882	884	887	889	892
707	894	897	899	901	904	906	909	911	913	916
708	918	921	923	926	928	931	933	936	939	941
709	944	947	949	952	954	957	959	962	964	966
710	969	971	973	975	978	980	982	984	987	989
711	991	993	995	997	999	1001	1003	1005	1007	1009
712	1011	1013	1015	1017	1019	1022	1024	1026	1028	1031
713	1033	1035	1038	1040	1042	1044	1046	1048	1050	1053
714	1055	1057	1059	1061	1063	1066	1068	1070	1072	1074
715	1077	1079	1081	1083	1086	1088	1090	1092	1095	1097
716	1099	1102	1104	1106	1108	1111	1113	1115	1117	1119
717	1122	1124	1126	1129	1131	1134	1136	1139	1141	1144
718	1146	1148	1151	1153	1156	1158	1161	1163	1165	1168
719	1170	1172	1175	1177	1179	1182	1184	1186	1189	1191
720	1193	1196	1198	1201	1204	1206	1209	1211	1214	1217
721	1220	1222	1225	1228	1230	1233	1236	1239	1242	1244
722	1247	1250	1253	1256	1259	1262	1264	1267	1270	1273
723	1275	1278	1280	1283	1286	1289	1291	1294	1297	1300
724	1302	1305	1308	1311	1314	1317	1320	1323	1326	1328
725	1331	1334	1338	1341	1344	1347	1350	1353	1356	1360
726	1363	1366	1369	1372	1376	1379	1382	1386	1389	1392
727	1395	1399	1402	1405	1408	1412	1415	1418	1421	1424
728	1427	1430	1433	1437	1440	1443	1446	1449	1452	1455
729	1459	1462	1465	1468	1472	1475	1478	1482	1485	1489
730	1492	1496	1499	1503	1507	1510	1514	1518	1522	1526
731	1529	1533	1537	1540	1544	1548	1552	1555	1559	1563
732	1567	1570	1574	1578	1581	1585	1588	1592	1595	1599
733	1602	1606	1609	1613	1616	1620	1624	1627	1630	1634
734	1637	1641	1644	1648	1651	1654	1658	1661	1664	1668
735	1671	1674	1677	1681	1684	1687	1690	1694	1697	1700
736	1703	1706	1710	1713	1716	1719	1722	1725	1729	1732
737	1735	1738	1741	1744	1747	1750	1753	1756	1759	1762
738	1765	1768	1771	1775	1778	1781	1784	1787	1791	1794
739	1797	1800	1803	1807	1810	1813	1816	1819	1823	1826
740	1829	1832	1835	1838	1841	1844	1847	1850	1854	1857
741	1860	1864	1867	1870	1874	1877	1880	1884	1887	1890
742	1893	1897	1900	1903	1907	1910	1913	1917	1920	1923

RESERVOIR AREA TABLE

SQUAW CREEK RESERVOIR MAY 1997 SURVEY

AREA IN ACRES ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
743	1926	1930	1933	1936	1940	1943	1947	1950	1954	1957
744	1960	1964	1967	1970	1974	1977	1980	1984	1987	1990
745	1993	1996	2000	2003	2006	2009	2013	2016	2019	2023
746	2026	2029	2032	2036	2039	2042	2046	2049	2052	2056
747	2059	2062	2065	2069	2072	2075	2079	2082	2085	2088
748	2092	2095	2098	2101	2105	2108	2111	2114	2117	2121
749	2124	2127	2130	2134	2137	2140	2143	2147	2150	2153
750	2157	2160	2164	2167	2171	2174	2178	2182	2185	2189
751	2193	2196	2200	2204	2207	2211	2215	2219	2222	2226
752	2230	2234	2238	2242	2246	2250	2254	2258	2262	2266
753	2270	2273	2277	2281	2285	2289	2292	2296	2300	2303
754	2307	2311	2315	2318	2322	2326	2330	2334	2338	2342
755	2345	2349	2353	2357	2361	2365	2368	2372	2376	2380
756	2384	2388	2392	2396	2400	2404	2408	2412	2416	2419
757	2423	2427	2431	2435	2439	2443	2447	2451	2455	2459
758	2463	2467	2471	2475	2479	2483	2487	2491	2495	2499
759	2503	2507	2511	2515	2519	2523	2527	2532	2536	2541
760	2545	2549	2553	2558	2562	2566	2570	2575	2579	2583
761	2587	2591	2596	2600	2604	2608	2613	2617	2621	2626
762	2630	2634	2639	2643	2647	2652	2656	2660	2664	2668
763	2673	2677	2681	2685	2690	2694	2698	2703	2707	2711
764	2716	2720	2724	2729	2733	2737	2741	2746	2750	2754
765	2758	2763	2767	2772	2776	2781	2785	2790	2794	2799
766	2804	2808	2813	2818	2822	2827	2832	2837	2842	2846
767	2851	2856	2861	2866	2871	2876	2882	2887	2892	2897
768	2902	2907	2912	2917	2922	2927	2932	2937	2942	2948
769	2953	2958	2963	2967	2972	2977	2982	2987	2992	2997
770	3002	3007	3012	3017	3022	3027	3032	3037	3042	3048
771	3053	3059	3065	3071	3077	3084	3090	3096	3102	3108
772	3114	3120	3126	3132	3138	3145	3151	3157	3163	3169
773	3175	3181	3187	3193	3199	3206	3212	3218	3224	3230
774	3236	3242	3248	3254	3260	3267	3273	3279	3285	3291
775	3297									

TEXAS WATER DEVELOPMENT BOARD
RESERVOIR VOLUME TABLE

Aug 6 1997

MINI-DAM(SQUAW CREEK) MAY 1997 SURVEY

VOLUME IN ACRE-FEET ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
739										
740										
741										
742				1	1	1	1	1	1	1
743	1	1	1	1	1	2	2	2	2	2
744	2	3	3	3	3	3	4	4	4	4
745	5	5	5	6	6	6	7	7	7	8
746	8	8	9	9	10	10	10	11	11	12
747	12	13	13	14	14	15	15	16	16	17
748	17	18	19	19	20	20	21	22	22	23
749	23	24	25	25	26	27	27	28	29	29
750	30	31	32	32	33	34	35	35	36	37
751	38	38	39	40	41	42	43	43	44	45
752	46	47	48	49	50	51	52	53	54	56
753	57	58	59	60	62	63	64	66	67	68
754	70	71	73	74	75	77	78	80	82	83
755	85	86	88	89	91	93	94	96	98	100
756	101	103	105	107	108	110	112	114	116	118
757	120	122	123	125	127	129	131	133	135	137
758	139	141	143	145	147	149	151	153	156	158
759	160	162	164	166	168	170	173	175	177	179
760	181	184	186	188	190	193	195	197	200	202
761	204	207	209	211	214	216	219	221	223	226
762	228	231	233	236	239	241	244	246	249	252
763	254	257	259	262	265	267	270	273	276	278
764	281	284	287	289	292	295	298	301	304	306
765	309	312	315	318	321	324	327	330	333	336
766	339	342	345	349	352	355	358	361	364	368
767	371	374	377	381	384	387	391	394	397	401
768	404	408	411	415	418	422	425	429	432	436
769	440	443	447	451	454	458	462	466	469	473
770	477	481	485	489	493	497	501	505	509	513
771	517	521	525	529	534	538	542	546	551	555
772	559	564	568	572	577	581	586	590	595	599
773	604	609	613	618	622	627	632	637	641	646
774	651	656	661	666	671	676	681	686	691	696
775	701									

TEXAS WATER DEVELOPMENT BOARD
RESERVOIR AREA TABLE

Aug 6 1997

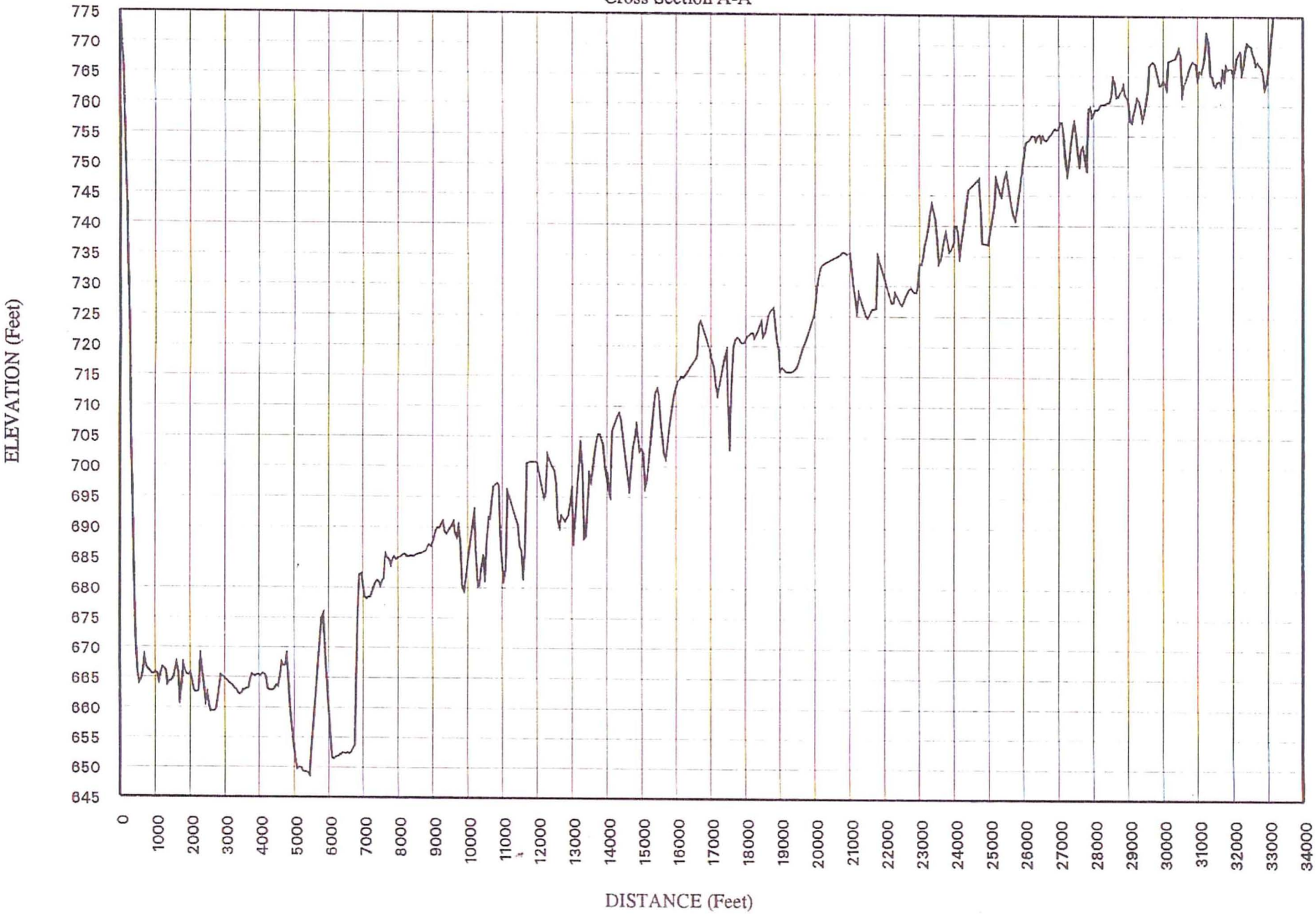
MINI-DAM(SQUAW CREEK) MAY 1997 SURVEY

AREA IN ACRES — ELEVATION INCREMENT IS ONE TENTH FOOT

ELEV. FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
739										
740										
741										
742					1	1	1	1	1	1
743	1	1	1	1	1	1	2	2	2	2
744	2	2	2	2	2	2	2	2	3	3
745	3	3	3	3	3	3	3	3	4	4
746	4	4	4	4	4	4	4	4	4	5
747	5	5	5	5	5	5	5	5	6	6
748	6	6	6	6	6	6	6	6	6	6
749	6	6	7	7	7	7	7	7	7	7
750	7	7	7	7	7	7	8	8	8	8
751	8	8	8	8	8	8	9	9	9	9
752	9	9	10	10	10	11	11	11	12	12
753	12	12	12	13	13	13	13	13	14	14
754	14	14	14	15	15	15	15	15	15	16
755	16	16	16	16	16	17	17	17	17	17
756	17	18	18	18	18	18	19	19	19	19
757	19	19	19	19	19	20	20	20	20	20
758	20	20	20	20	20	21	21	21	21	21
759	21	21	21	21	22	22	22	22	22	22
760	22	22	22	23	23	23	23	23	23	23
761	23	24	24	24	24	24	24	25	25	25
762	25	25	25	25	26	26	26	26	26	26
763	26	26	27	27	27	27	27	27	27	27
764	28	28	28	28	28	28	28	29	29	29
765	29	29	29	29	30	30	30	30	30	31
766	31	31	31	31	31	32	32	32	32	32
767	32	33	33	33	33	33	34	34	34	34
768	34	35	35	35	35	35	36	36	36	36
769	36	37	37	37	37	37	38	38	38	38
770	39	39	39	39	40	40	40	40	41	41
771	41	41	42	42	42	42	43	43	43	43
772	44	44	44	44	44	45	45	45	45	46
773	46	46	46	47	47	47	47	48	48	48
774	48	49	49	49	49	50	50	50	50	51
775	53									

SQUAW CREEK RESERVOIR

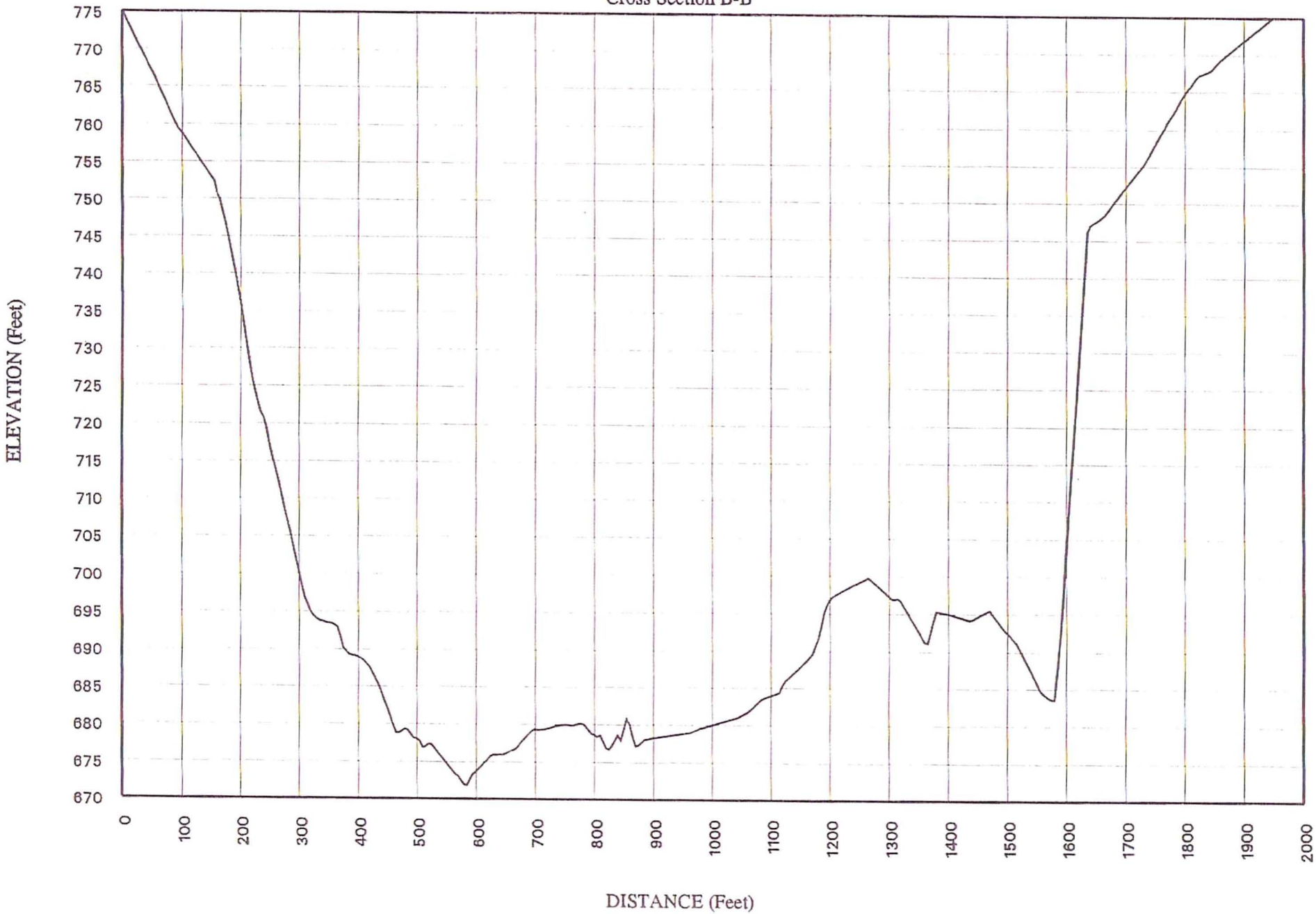
Cross Section A-A′



PREPARED BY: TWDB OCTOBER 1997

SQUAW CREEK RESERVOIR

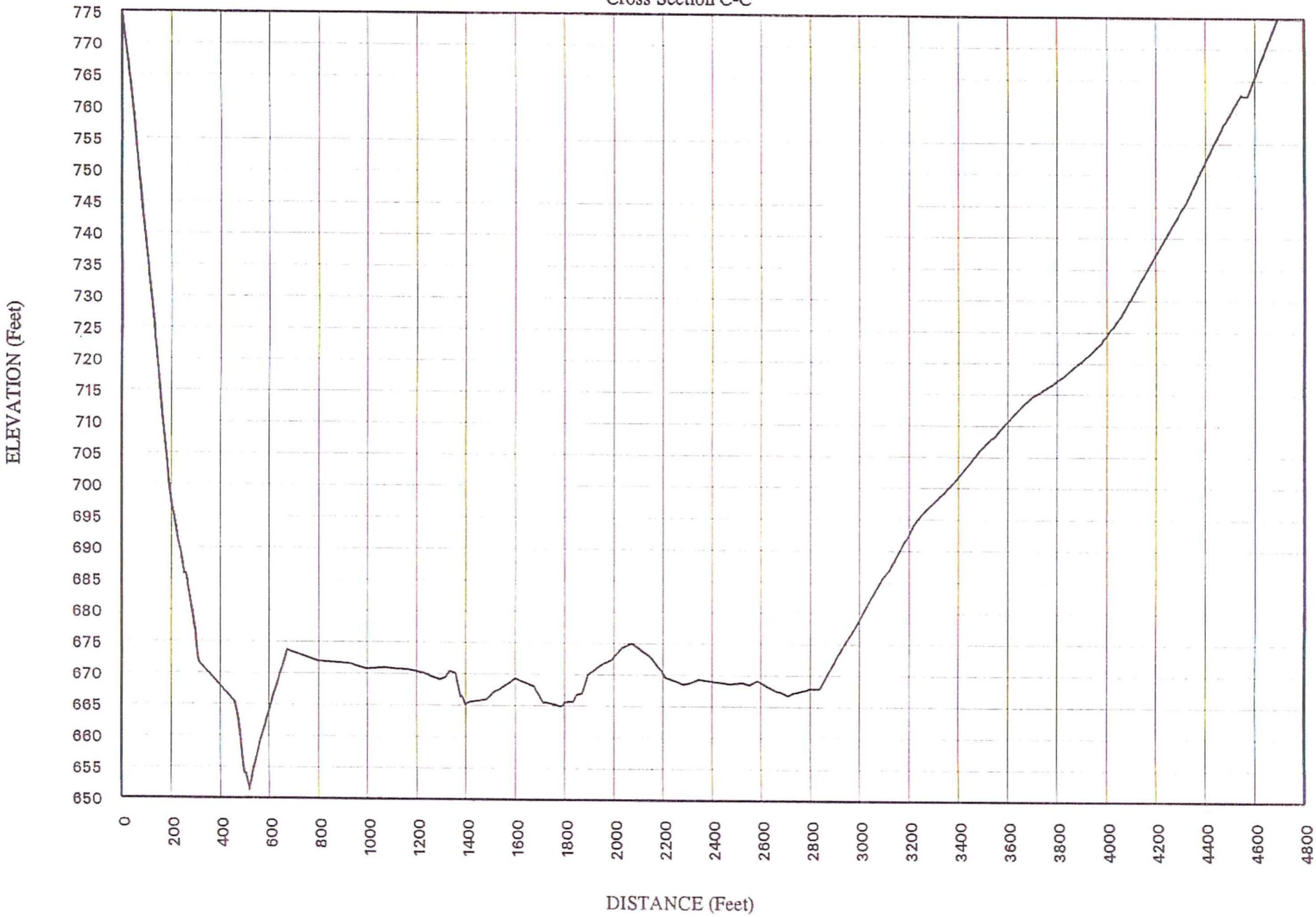
Cross Section B-B′



PREPARED BY: TWDB OCTOBER 1997

SQUAW CREEK RESERVOIR

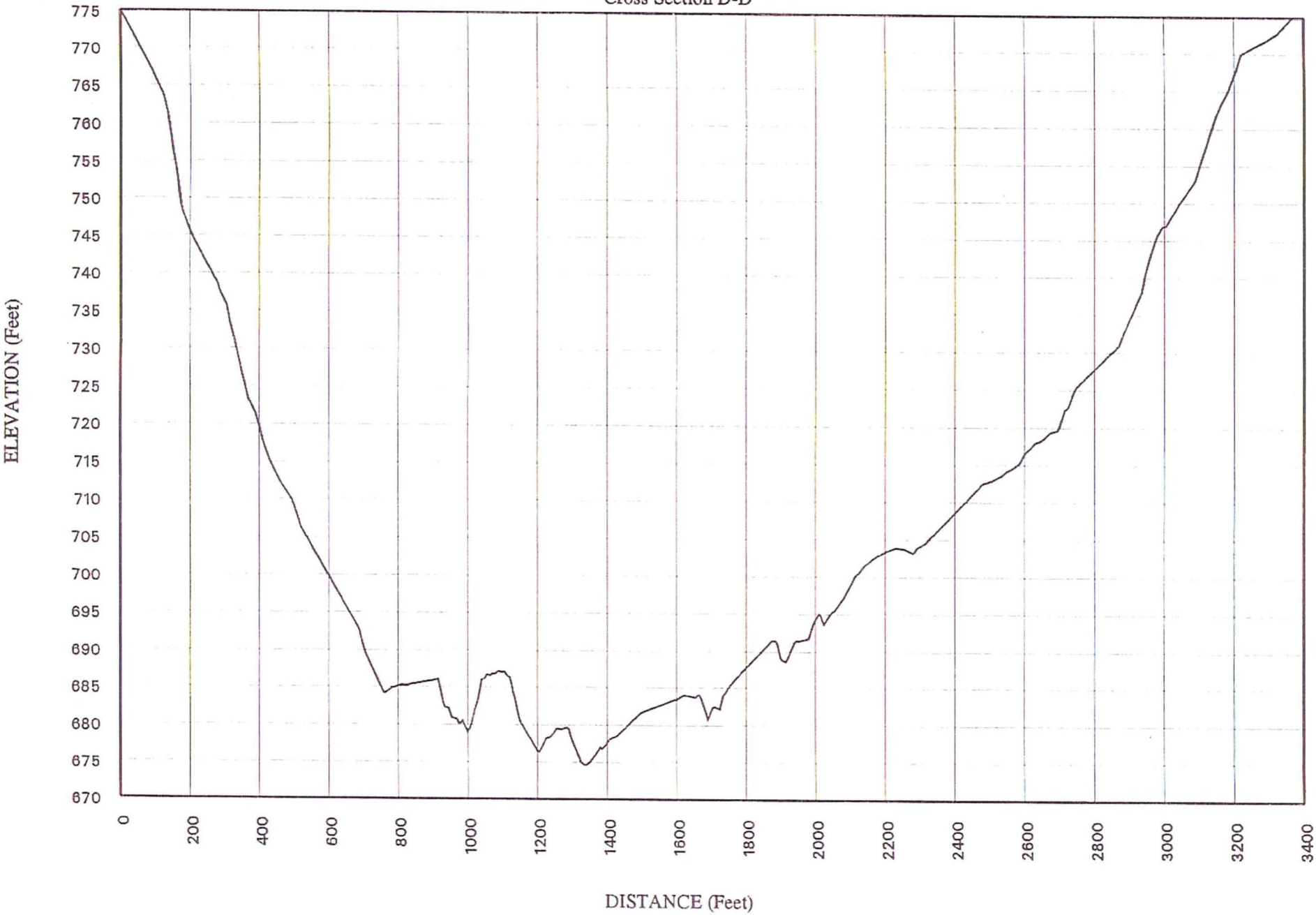
Cross Section C-C′



PREPARED BY: TWDB OCTOBER 1997

SQUAW CREEK RESERVOIR

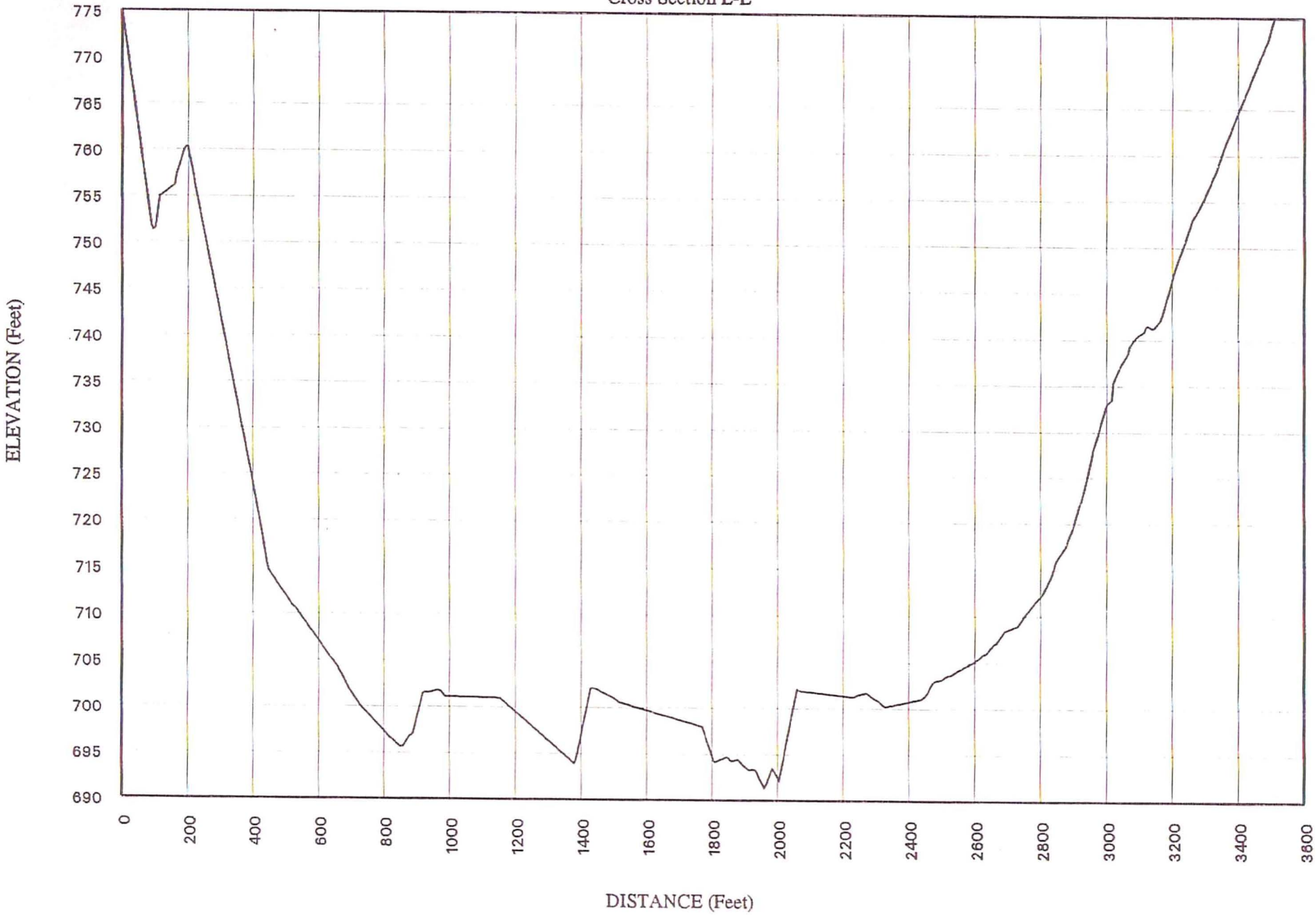
Cross Section D-D′



PREPARED BY: TWDB OCTOBER 1997

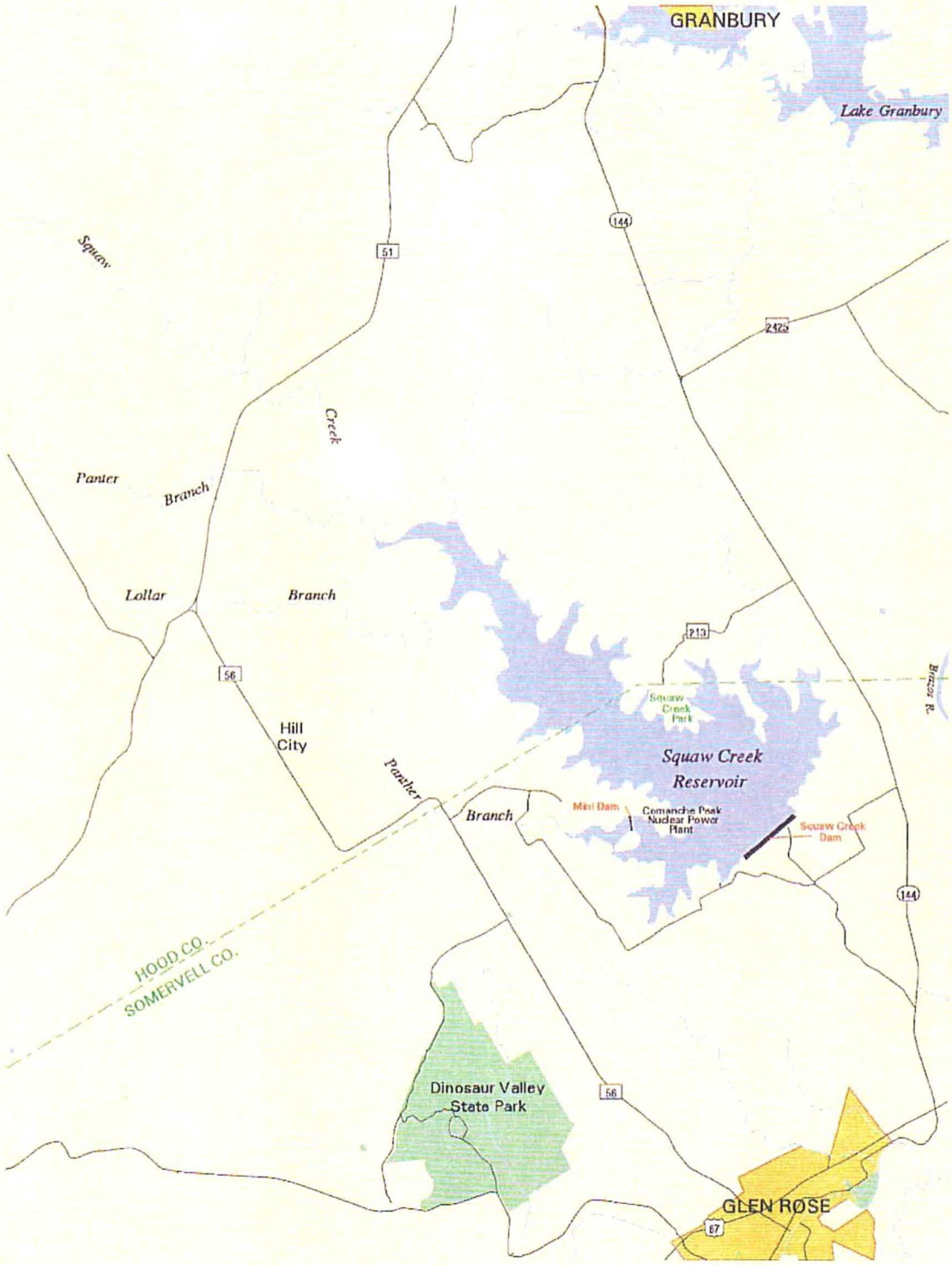
SQUAW CREEK RESERVOIR

Cross Section E-E′



PREPARED BY: TWDB OCTOBER 1997

FIGURE 1
SQUAW CREEK RESERVOIR
Location Map



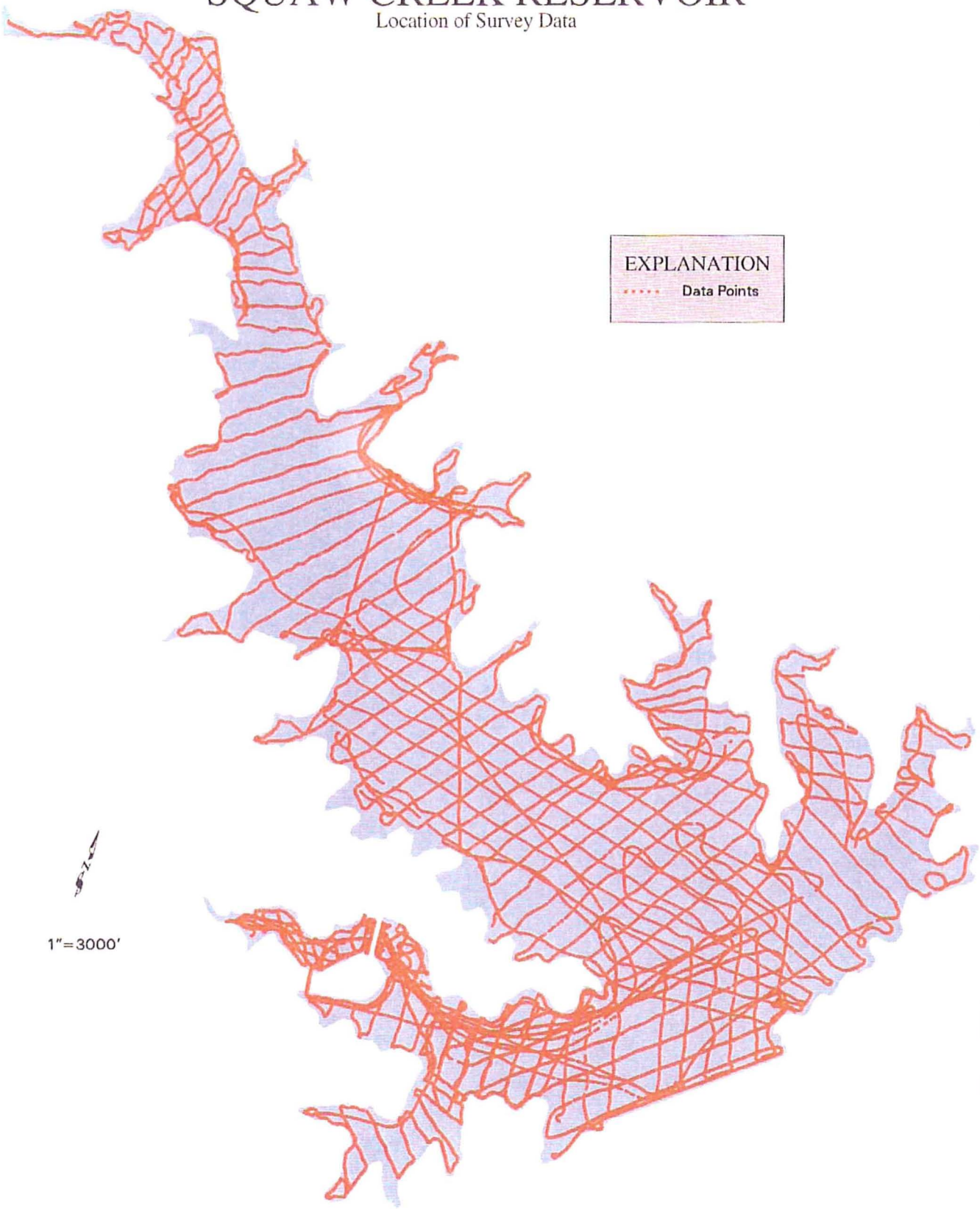
PREPARED BY: TWDB OCTOBER 1997

1"=9000'

FIGURE 2

SQUAW CREEK RESERVOIR

Location of Survey Data

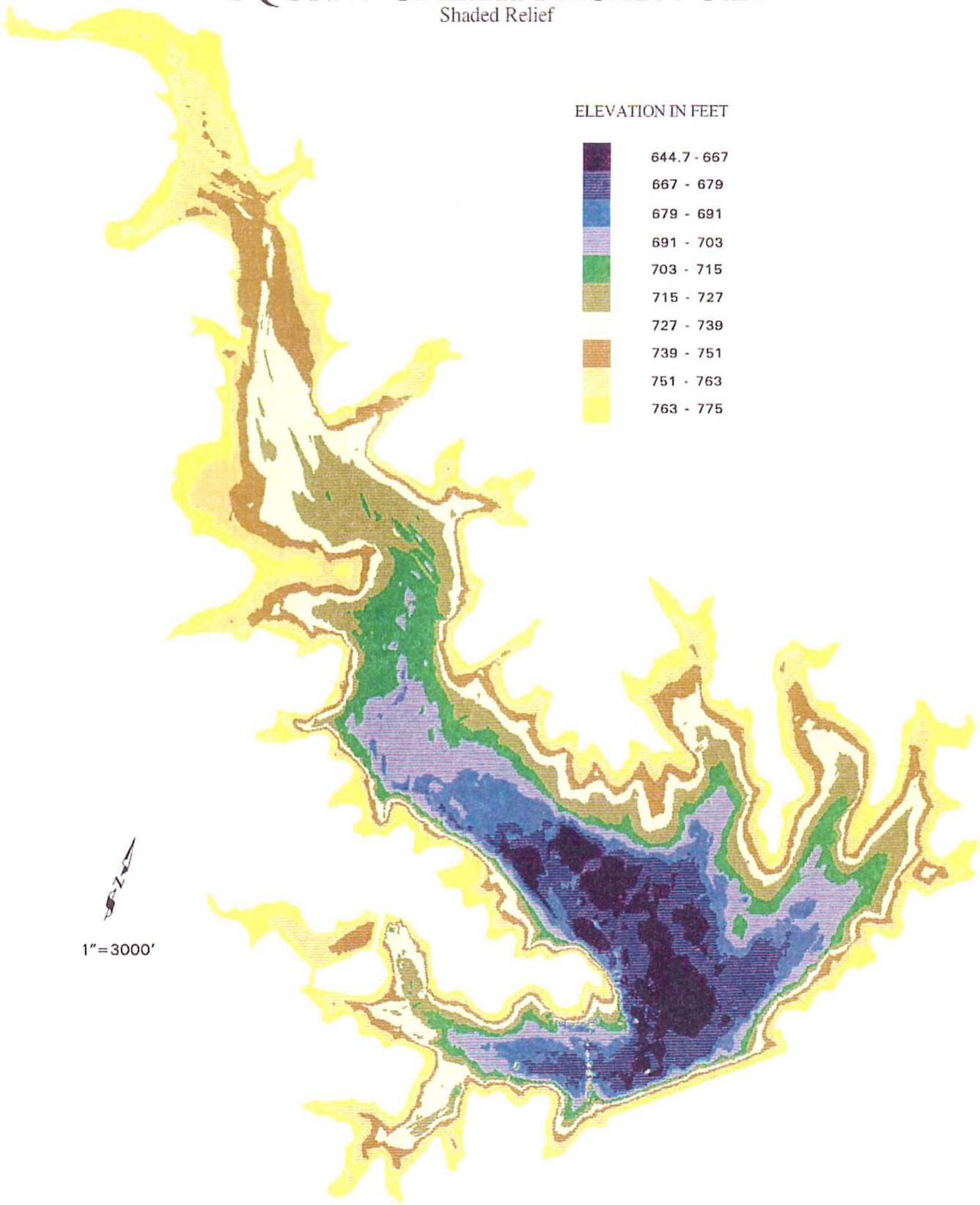


PREPARED BY: TWDB OCTOBER 1997

FIGURE 3

SQUAW CREEK RESERVOIR

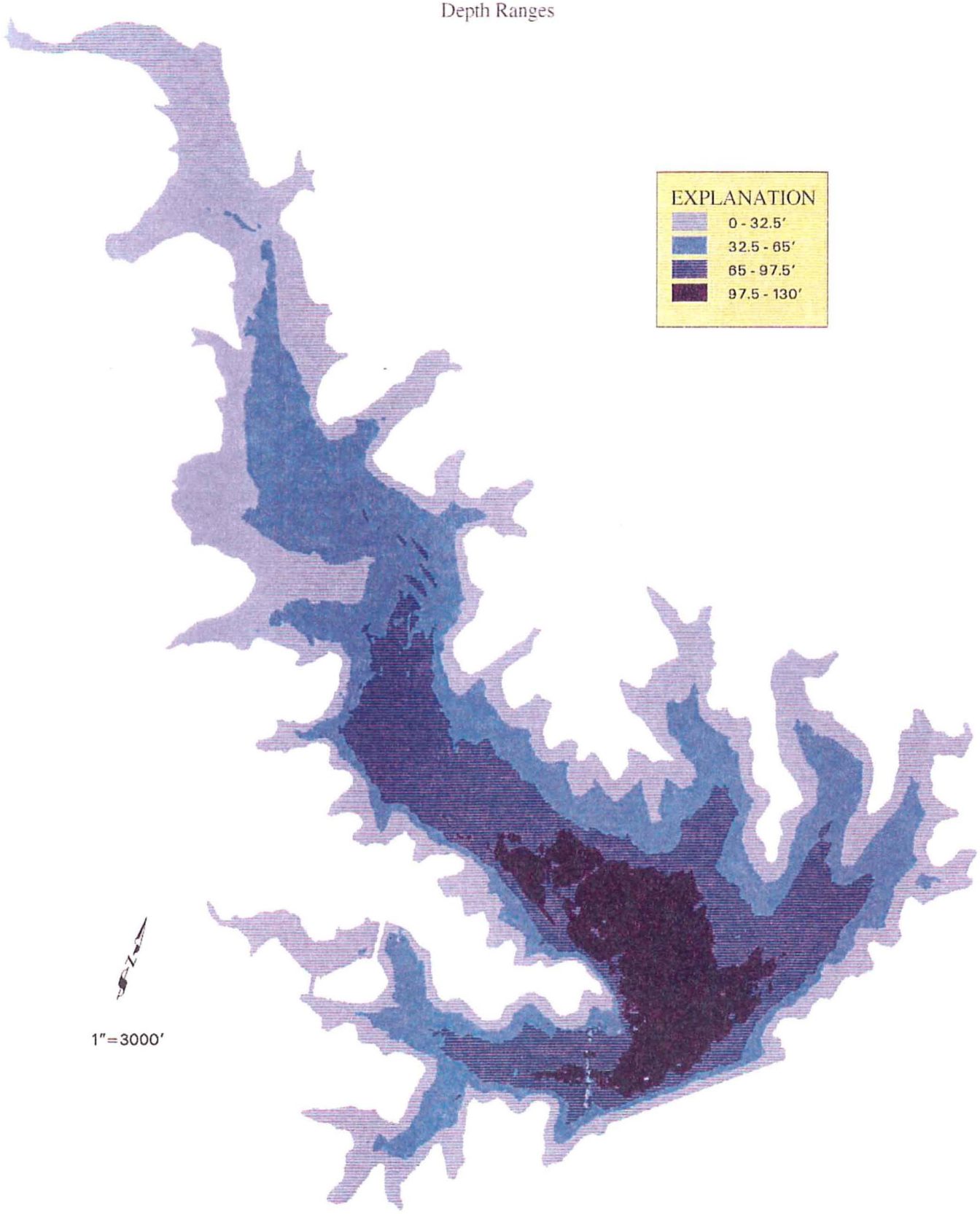
Shaded Relief



PREPARED BY: TWDB OCTOBER 1997

FIGURE 4
SQUAW CREEK RESERVOIR

Depth Ranges



PREPARED BY: TWDB OCTOBER 1997