VOLUMETRIC SURVEY REPORT

OF

Possum Kingdom Lake

December 2004-January 2005 SURVEY

Prepared by the:

TEXAS WATER DEVELOPMENT BOARD

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Prepared for:

Brazos River Authority

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Executive Summary

In 2003 the Texas Water Development Board (TWDB) entered into agreement with the Brazos River Authority (BRA) for the purpose of conducting a volumetric survey of Possum Kingdom Lake while the reservoir was at or near the top of the conservation pool elevation (CPE). These data were then converted into updated Elevation-Volume and Elevation-Area Tables. As one of the older reservoirs in Texas, deliberate impoundment of Possum Kingdom Lake began on March 21, 1941.

The results of the TWDB 2004-2005 Volumetric Survey indicate Possum Kingdom Lake has a volume of 540,340 ac-ft, and extends across 16,716 surface acres at CPE. This represents an estimated 25% decrease from the reservoir's original design volume of 724,739 ac-ft and a 16% decrease from the original surface area of 19,800 ac. Between 1941 and 2005, two additional surveys were conducted on Possum Kingdom Lake. In 1974, URS/Forrest & Cotton estimated the reservoir's volume at 570,243 ac-ft. with a surface area of 17,700 ac. Then in 1994, the TWDB surveyed the reservoir estimating the volume at 556,220 ac-ft and the surface area at 17,624 ac. As part of the analysis in 2005, staff revised the TWDB 1994 results using an updated boundary created from 1995 aerial photographs, which were not available for the 1994 report. The volume in 1994 is now estimated to have been 548,217 ac-ft.

To determine the location and thickness of sediment in the reservoir, multi-frequency data were collected along 27 historical sediment range lines. Additionally, multi-frequency data were collected along 4 range lines, established for this report, in the Carter Bend/ Rock Creek area of the reservoir. This work was conducted pro bono by the TWDB. The multi-frequency data makes it possible to distinguish the sediment layers. However, no independent ancillary data (core samples) were collected to verify the signal interpretation. While no quantitative analysis was done with these multi-frequency data, results compare well with past and present surveys. This cross-sectional comparison is discussed in the Multi-frequency Plots section of this report.

Table of Contents

Tables

List of Figures

Table of Contents (continued)

List of Figures (continued)

Appendices

Reservoir History and General Information

Morris Sheppard Dam and Possum Kingdom Lake are located on the Brazos River in Palo Pinto County, 18 miles southeast of Graham, TX.[1] The reservoir inundates parts of several counties, including Palo Pinto, Stephens, and Young (see Figure 1). The reservoir was built to provide hydroelectric power during peak usage, and control the floodwaters of the Brazos River.[2] Table 1, on page 3, lists pertinent information for Morris Sheppard Dam and Possum Kingdom Lake.

The Morris Sheppard Dam was not the first attempt to control the Brazos River. In 1902, the Brazos River Impoundment Association, formed by leaders of cities and counties on the river, planned to control the river but were hindered by a lack of funding. In 1905, The Rivers and Harbors Act provided funds for the construction of a lock and dam system between Waco and Washington, but the flood of 1913 destroyed the work completed before World War I. In 1915, the Brazos River and Valley Improvement Association of Waco, attempted to tame the Brazos River, but their plans were also thwarted by a lack of funding. In 1917, the Conservation Amendment to the Texas Constitution declared the control, prevention, and distribution of flood and storm waters to be the duty of the state. Another flood in 1921, worse than the 1913 flood caused the state to officially tame the river. In 1923 the Texas State Legislature appropriated funds for a survey of all rivers of the state and analysis of flood and water problems. The study established the need for an agency with the necessary power to harness the Brazos River. In 1929, The Brazos River Conservation and Reclamation District was created under Article XVI, Section 59 of the Texas Constitution. The District was directed to conserve, control, and utilize to beneficial service the storm and floodwaters of the Brazos River and its tributaries. In 1933, the U.S. Congress passed the National Industrial Recovery Act. Title II created the Public Works Administration to provide funding through loans and grants to stimulate construction. In 1935, The District completed its master plan calling for 13 dams on the Brazos River and its tributaries.[2] Construction of The District's first dam and reservoir project, Possum Kingdom Lake, began on May 29, 1938. On March 21, 1941, construction was complete and deliberate impoundment began. Power generation began on April 17, 1941[1]. In 1955, The District was officially

given a new name, the Brazos River Authority. The Possum Kingdom Reservoir project cost $8.5 million. Recently, another $32 million was spent to repair and maintain the facilities.[3]

Permit No. 1262 (Application No. 1351) of May 9, 1938 allowed for construction of a dam to impound 750,000 acre-feet of water and the appropriation of 1,500,000 acre-feet of water annually for municipal, industrial, mining, irrigation, recreational, and power generation uses.[1] A Texas Water Commission System Order, effective July 23, 1964, and amended July 23, 1968, February 1, 1977, and January 31, 1983 to include future reservoirs, requires Possum Kingdom and all other reservoirs on the Brazos River and its tributaries to operate as one system for more effective conservation and beneficial utilization of the available water resources. An Amendment to Permit to Appropriate State Water, no. 1262A, November 7, 1986, authorizes an inter-basin transfer to the Trinity River Basin of up to 5,240 acre-feet of water per annum of the municipal authorization from Possum Kingdom Reservoir. Prior to transfer the water is released from Possum Kingdom, and conveyed to Lake Granbury via the Brazos River, where it is diverted to the Trinity River Basin. Certificate of Adjudication 12-5155, authorizes the BRA to maintain an existing dam and reservoir on the Brazos River (Possum Kingdom Lake) and impound therein no more than 724,739 acre-feet of water. The BRA is authorized a priority right to divert and use not to exceed 230,750 acre-feet of water per annum for municipal, industrial, irrigation and mining purposes. For the purposes of system operation the BRA is authorized to exceed the priority right, and annually divert and use up to 175,000 acre-feet of water for municipal purposes, of which no more than 5,240 acre-feet of the municipal authorization may be transferred to the Trinity River Basin; 250,000 acre-feet of water for irrigation purposes, and 49,800 acre-feet for mining purposes. Any diversions and use of water from Possum Kingdom exceeding 230,750 acre-feet annually will be charged against the sum of the amounts designated as priority rights in other reservoirs included in the System Operation Order. The BRA may also use the impounded water for non-consumptive recreational purposes and is further authorized an additional non-priority right for the non-consumptive use of water released for hydroelectric power generation.

Table 1. Pertinent Data for Possum Kingdom Lake and Morris Sheppard Dam

Owner and Operator of Possum Kingdom Lake and Facilities
The Brazos River Authority

Engineer (Design)
Ambursen Engineering Corporation

General Contractor
C.F. Lytle and A.L. Johnson

Location of Dam
On the Brazos River in Palo Pinto County, 18 miles southeast of Graham, TX.

Drainage Area
22,550 square miles, of which 9,240 is probably noncontributing

Dam

Type	Anbursen-Type, buttress w/ flat-slab deck and earthen dike
Length (total)	2,740 ft
Maximum Height	189 ft
Top Width	14.8 ft

Spillway

Type	Gated-controlled ogee weir
Crest elevation	987.0 ft above msl
Control	9 roof-weir gates, each 73.66 by 13 ft

Outlet Works

Type	1 conduit, 54-inch diameter
Control	Valve
Invert Elevation	874.8 ft above msl

Normal discharge is from turbine operation.

Power Generation Features
Two generating units, each 11,250 kw capacity

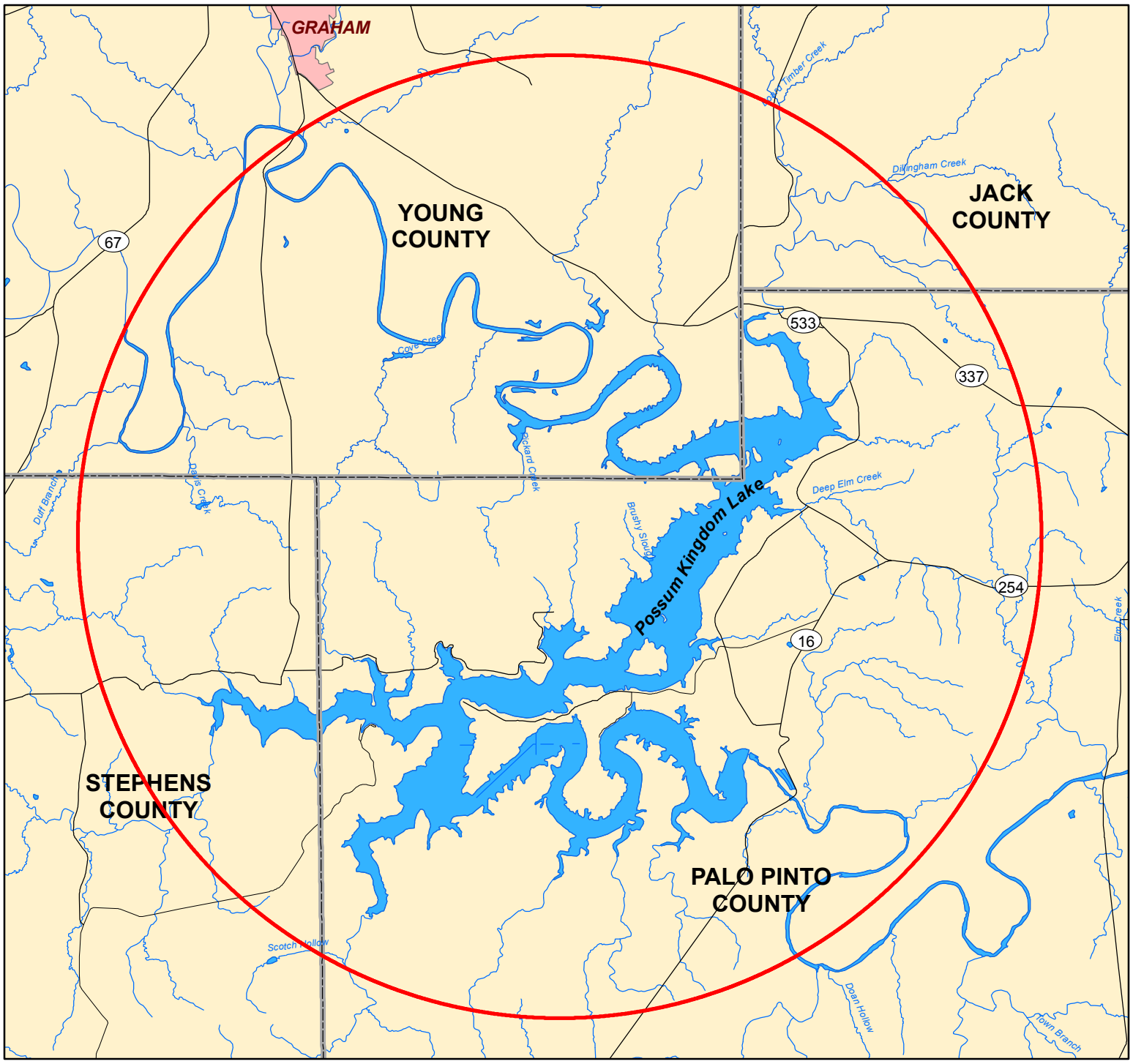
Reservoir Data (Based on TWDB 2004-2005 volumetric survey)

Feature	**Elevation (ft above msl)**	**Capacity (Acre-feet)**	**Area (Acres)**
Top of Dam	1,024.0	N/A	N/A
Top of Gates	1,000.0	540,340	16,716
Spillway Crest	987.0	355,570	11,772

Figure 1

POSSUM KINGDOM LAKE

Location Map



Texas Water Development Board
Hydro Survey

Volumetric Survey of Possum Kingdom Lake

Introduction

In 2003 the Texas Water Development Board (TWDB) entered into agreement with the Brazos River Authority (BRA) for the purpose of conducting a volumetric survey of Possum Kingdom Lake while the reservoir was at or near the top of the conservation pool elevation (CPE), and converting this information into updated Elevation-Volume and Elevation-Area Tables. The results are compared to prior surveys of Possum Kingdom Lake conducted in 1941, the original design as reported by the BRA, 1974, a sediment survey by URS/Forrest & Cotton, and 1994, a Volumetric Survey by the TWDB. Additionally, the TWDB surveyed 27 of the 31 original sediment range lines established in 1938, using a multi-frequency bottom profiler, which measures actual sediment thicknesses. These cross-sections are compared to cross-sections of the 2004-2005 TWDB Volumetric Survey and the revised 1994 TWDB Volumetric Survey. Fourteen miles of the Brazos River were also surveyed as part of the 2004-2005 Volumetric Survey.

Volumetric Survey

The volumetric survey of Possum Kingdom Lake occurred between December 12, 2004 and January 12, 2005, while the water surface elevation was slightly below the conservation pool elevation of 1,000.0 ft above mean sea level (msl)[4]. The water surface elevation varied between 998.74 ft and 999.36 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 2004-2005 Survey, the team navigated approximately 450 miles of range lines and collected over 268,000 data points.

Datum

The horizontal datum used for this report is NAD83 State Plane Texas Central Zone. The vertical datum used during this survey is that used by the United States Geological Survey (USGS) for the reservoir elevation gauge USGS 08088500 Possum Kingdom Lk nr Graford, TX.[5] The datum for this gauge is reported as 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.

To ensure water surface elevations were consistent throughout the entire reservoir, the TWDB survey team installed three pressure transducers within Possum Kingdom Reservoir and recorded water surface elevation in the vicinity of each instrument during the survey. The instruments were installed to monitor for significant inflow or wind events that may have caused the water surface elevation in the upper reaches to vary from the water surface elevation at the dam. The transducers indicated the reservoir did not have any significant water surface elevation changes between the upper reaches and the dam during the times of data collection. A detailed explanation about the transducers, where they were installed, and how water surface elevation was calculated, is presented in Appendix A.

Survey Results

Results of the TWDB 2004-2005 Volumetric Survey indicate Possum Kingdom Lake has the ability to store 540,340 ac-ft, while encompassing 16,716 surface acres at CPE. Table 2, on the following page, compares the current survey with previous surveys of Possum Kingdom Lake.

Table 2. TWDB volumetric and historical sediment survey results for Possum Kingdom Lake.

CPE 1,000 ft	Original Design*[1] 1941	URS/Forrest & Cotton 1974	(Revised) TWDB 1994	TWDB 2004-2005
Area (ac)	19,800	17,700	16,716	16,716
Volume (ac-ft)	724,739	570,243	548,217	540,340

*As reported by the Brazos River Authority.

The 1994 TWDB Volumetric Survey Report of Possum Kingdom Lake[6], indicates Possum Kingdom Lake decreased 0.4% in area and lost 2.5% of its capacity since 1974, and decreased 11% in area and lost 23.3% of its original capacity. The survey team revised the 1995 survey using the boundary from the 2004-2005 report for the purpose of directly comparing any changes in volume between 1994 and 2005. The 2005 boundary was digitized from 1995, 1:12,000 scale, aerial photographs and is considered a better estimate of the true reservoir boundary over the 1994 report boundary digitized from 1:24,000 scale USGS topographic maps. Since both the 2005 and revised 1995 area calculations used the same boundary, no change in surface area at cpe was observed. However, a 1.4%, or 7,877 ac-ft, decrease in volume occurred between the 2004-2005 survey and the revised 1994 survey.

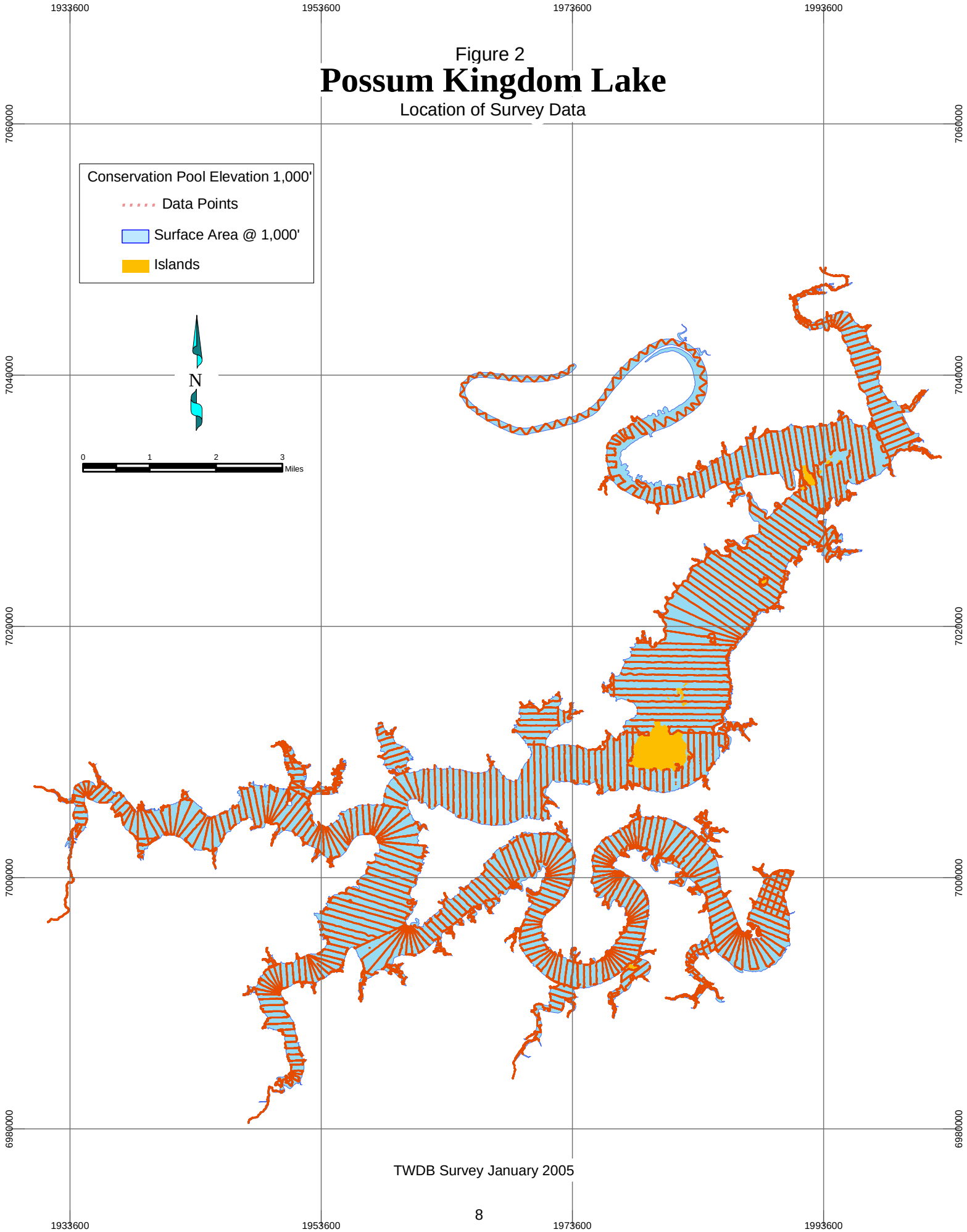
The addition of a shallow water boat during the TWDB 2004-2005 Survey allowed data to be collected in shallow areas near the shore and in a more perpendicular fashion in many of the coves. Figure 2, on page 8, presents the TWDB 2004-2005 survey data and Figure 3, on page 9, compares the data collected in 2005 to the data the TWDB collected in 1994.

Between the 2004-2005 Survey and the 1974 survey, Possum Kingdom Lake decreased 5.6% in area and 5.2% in volume. Since 1941, Possum Kingdom Lake decreased 15.6% in area and 25.4% in volume. Due to the different computational methods, comparisons between the original design and 1974 surveys, and the 1994 and 2004-2005 TWDB volumetric surveys are difficult and some changes may be due to methodological differences[7]. The results presented here, from the 2004-2005 survey, represent the best estimates of reservoir capacity and area that can be obtained in an objective manner given current technology and resources.

Figure 2

Possum Kingdom Lake

Location of Survey Data

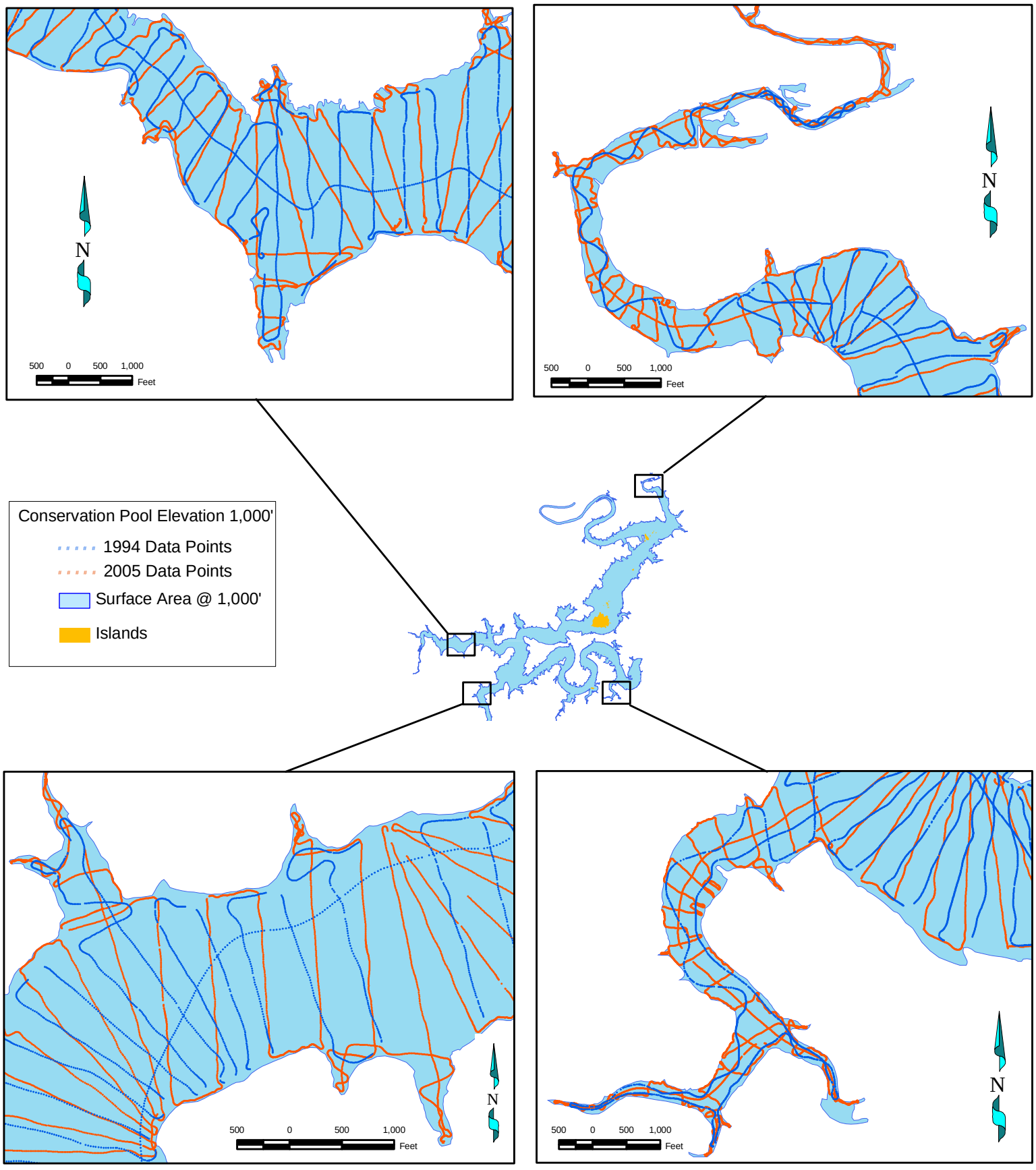


TWDB Survey January 2005

Figure 3

Possum Kingdom Lake

Comparison of 2005 and 1994 Survey Data



TWDB Survey January 2005

Data Processing

Model Boundary

The reservoir boundary was digitized from digital orthophoto quadrangle images (DOQs) using Environmental Systems Research Institute's (ESRI) ArcGIS 9.1 software. The DOQs used for Possum Kingdom Lake were Cove Creek, Fortune Bend, Brad, and Costello Island, photographed in January of 1995. At the time of the photographs the water surface elevation varied between 997.2 ft and 997.3 ft, therefore staff used a variety of methods and data sources, including: field observations, 1:24,000 scale hypsography (contours), and beaches and vegetation visible in the DOQs, to interpret the boundary to elevation 1,000 ft.

VARGIS of Texas LLC produced the DOQs for the Texas Orthoimagery Program (TOP). The DOQs produced for the Department of Information Resources and the GIS Planning Council under the TOP reside in the public domain. More information can be obtained on the Internet at http://www.tnris.state.tx.us/DigitalData/doqs.htm.

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.[8]

Using Arc/Info software, volumes and areas were calculated from the TIN Model from elevation 893.4 ft to elevation 1,000.0 ft at one-tenth of a foot intervals, for the entire reservoir. The Elevation-Volume and Elevation-Area Tables, updated for 2005, are presented in Appendices A and B, respectively. The 1994 Revised Survey Elevation-Volume and Elevation-Area Tables are presented in Appendices C and D. An Elevation-

Volume graph comparing the TWDB 2004-2005 Survey with the revised 1994 TWDB Survey is presented in Appendix E and an Elevation-Area graph, with a similar comparison, is presented in Appendix F. Appendix G presents an Area-Depth graph, also known as a Hypsographic Curve graph.

A raster image of the TIN Model was used to create Figure 4, an Elevation Relief Map representing the topography of the reservoir bottom, Figure 5, a map showing shaded depth ranges for Possum Kingdom Lake, and Figure 6, a 5-ft contour map.

Sediment Range Lines and Multi-frequency Plots

Prior to impoundment in 1938, sediment range lines were established to calculate original design capacity and sedimentation rates. In 1974, URS/ Forrest and Cotton Inc. performed a sediment survey using the original sediment range lines to recalculate capacity and compared their estimated sedimentation rates to rates published in the 1959 TWDB Bulletin 5912. In 2005, in addition to the volumetric survey, the TWDB team collected data along 27 of the original sediment range lines using a multi-frequency depth sounder, which allows for direct measurement of the sediment at these locations. Additionally, four sediment range lines were established in 2005 in the Carter Bend area of the reservoir, near the confluence of Rock Creek and the main body of the reservoir.

The multi-frequency bottom profiler operates on 24kHz, 50kHz, and 200kHz and uses a 16-bit digitizer to process the return signals. This configuration allows for the return signal to be displayed in over 65,000 shades of gray on all frequencies. When processed together these signals highlight individual sediment layers over a wide range of variability. The processing software adds a false coloring scheme to the data and allows each frequency to be weighted against the other frequencies, assisting in the interpretation of different sediment layers.

The acoustic reflectivity of reservoir sediments is not unique, and is dependent on many factors including; sediment density, water content, and grain size. Plots of the multi-frequency data are presented here with no corroborating data (core samples) and represent conservative estimates of sediment thickness.

Eighteen of the original ranges lines are plotted and presented on the following pages. The cross-sectional plots compare four cross-sections: the 1994 modeled cross sections, the 2004-2005 modeled cross sections (both collected during the volumetric survey using a 200 kHz depth sounder), the 200 kHz return from the multi-frequency profiler, and the estimated pre-impoundment (est. PI) boundary as interpreted from the multi-frequency profiler processing software.

The range lines are plotted looking downstream from left bank to right bank. The multi-frequency plots presented follow the boat direction regardless of whether it is left bank to right bank or the opposite, and are noted as such when they differ from the cross-sectional plots.

Figure 7, on page 15, shows the location of 31 of the original sediment range lines established for Possum Kingdom Lake in 1938, along with Table 3, the endpoint coordinates for these range lines. Generally, the 1994 and 2004-2005 survey results correlate well with the multi-frequency estimates. Some misalignments of the multi-frequency cross sectional areas occur because no corrections were made for the non-linear path of the boat. The results between TWDB 1994, TWDB 2004-2005, and the multi-frequency sediment interpolations were arrived at independently, therefore, it is interpreted that sediment deposition and movement remains active in the reservoir. However, it is recommended that the results of the multi-frequency work be verified with coring before they are used in any decision-making involving sediment volume.

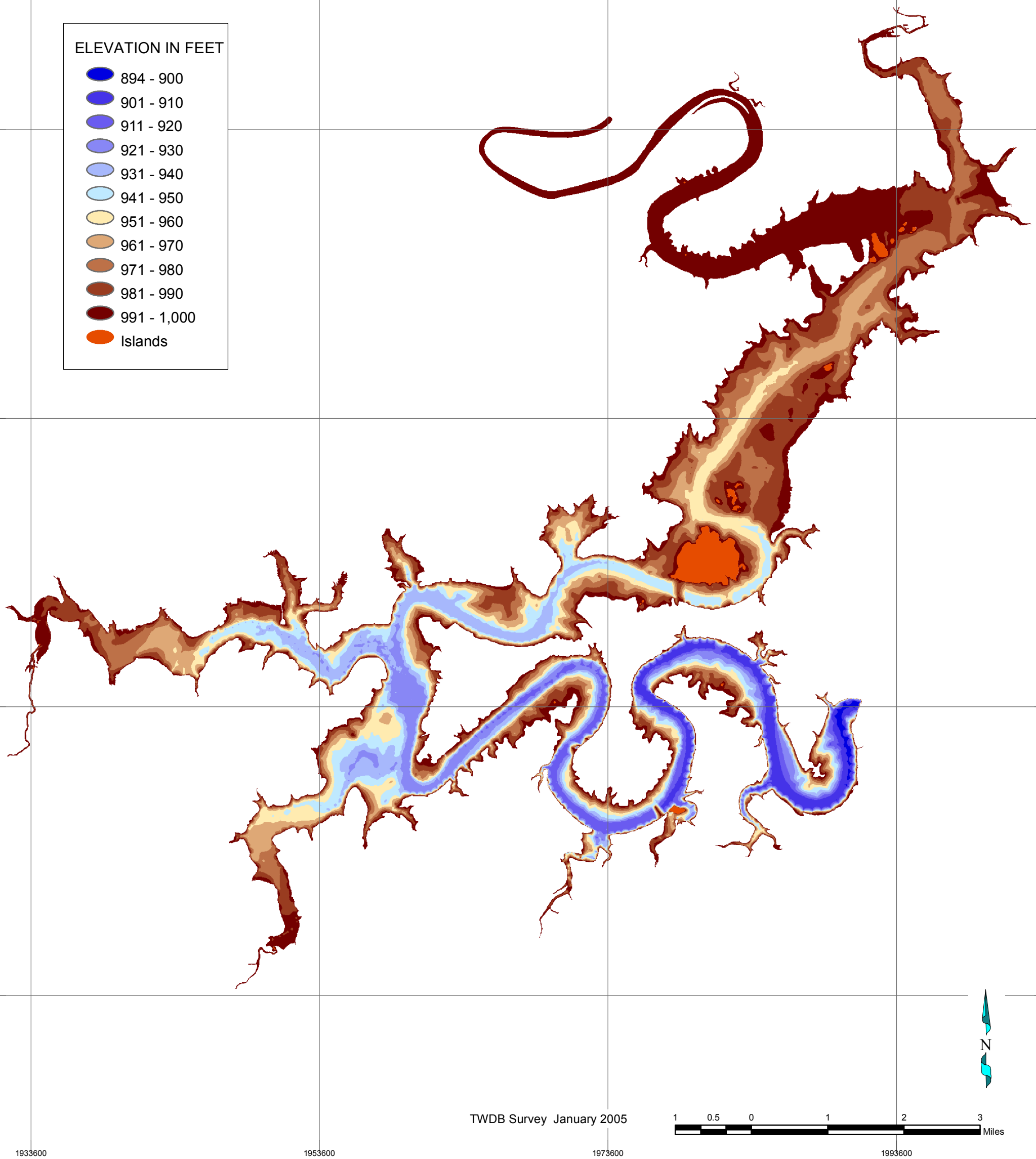
1933600 1953600 1973600 1993600

7060000 7040000 7020000 7000000 6980000

Figure 4

Possum Kingdom Lake

Elevation Relief



TWDB Survey January 2005

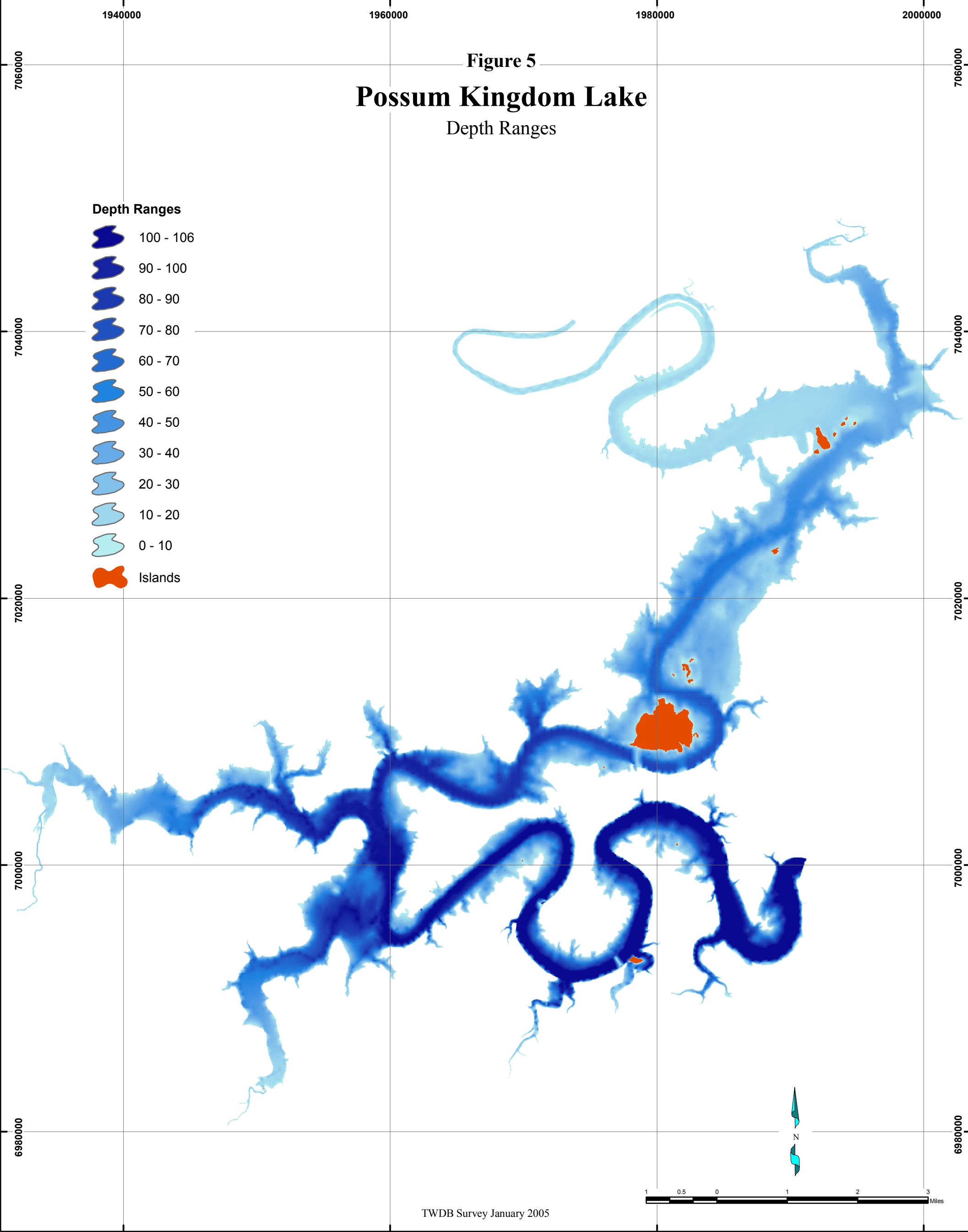
1 0.5 0 1 2 3 Miles

1933600 1953600 1973600 1993600

Figure 5

Possum Kingdom Lake

Depth Ranges



TWDB Survey January 2005

Figure 7

Possum Kingdom Lake

Historical Sediment Range Line Positions and Sediment Thickness

Range Lines
Est. 1938 — 13

Range Lines
Est. 2005 in the
Carter Bend area. — 32

Estimated sediment thicknesses are listed along side each range line. Generally, the sediment is evenly distributed across the old river channel and thins near each shore. When sediment thickness was estimated to vary along the transect a range of thicknesses is listed.

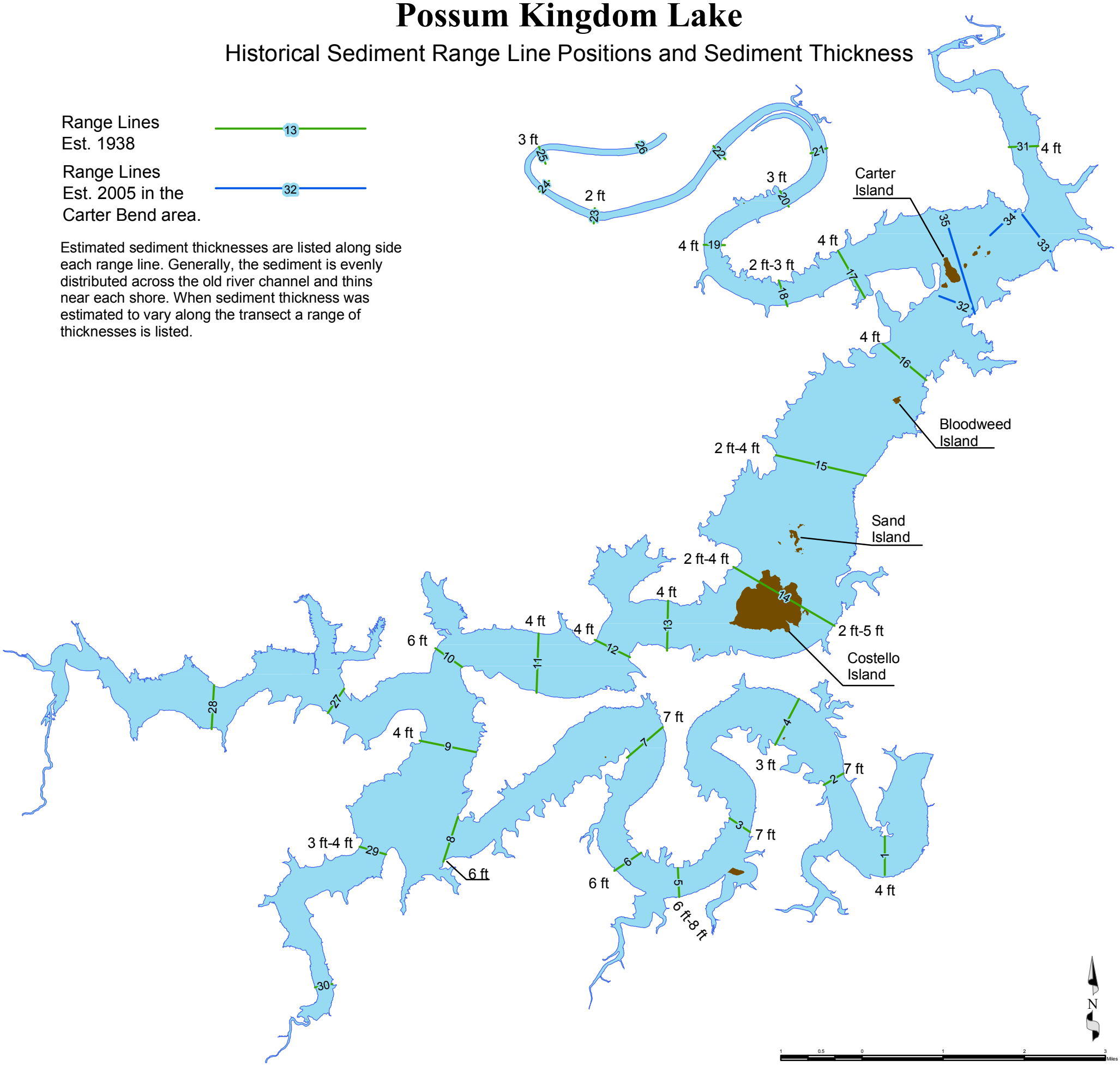


Table 3. Sediment Range Line Endpoints Est. 1938 NAD83 State Plane Texas North Central (feet) X_L/Y_L= Left Coordinates X_R/Y_R=Right Coordinates

Sediment Range Line	X_L	Y_L	X_R	Y_R	Sediment Range Line	X_L	Y_L	X_R	Y_R
SR01	1,988,065.0	6,995,165.0	1,988,078.5	6,992,654.0	SR17	1,985,039.9	7,033,249.0	1,986,788.1	7,030,192.0
SR02	1,985,382.5	6,999,256.5	1,984,104.4	6,998,502.5	SR18	1,981,172.0	7,031,319.0	1,981,735.9	7,029,639.5
SR03	1,977,970.9	6,996,345.0	1,979,303.6	6,995,442.0	SR19	1,977,685.9	7,033,625.0	1,976,287.9	7,033,634.5
SR04	1,982,487.9	7,004,110.5	1,980,945.3	7,001,110.5	SR20	1,981,827.3	7,036,106.5	1,981,253.5	7,037,134.0
SR05	1,974,609.3	6,993,100.0	1,974,701.6	6,991,220.0	SR21	1,984,334.4	7,039,932.5	1,983,238.6	7,039,595.5
SR06	1,972,226.6	6,994,113.0	1,970,495.5	6,992,933.0	SR22	1,976,931.9	7,040,053.5	1,977,696.8	7,039,208.5
SR07	1,973,644.3	7,002,282.5	1,971,290.5	7,000,282.0	SR23	1,969,219.5	7,036,016.0	1,969,139.3	7,035,019.5
SR08	1,960,327.1	6,996,448.0	1,959,363.3	6,993,517.0	SR24	1,966,245.3	7,037,797.0	1,965,618.6	7,037,096.0
SR09	1,961,508.0	7,000,650.0	1,957,826.0	7,001,396.0	SR25	1,966,016.1	7,038,907.0	1,965,577.3	7,040,011.0
SR10	1,960,593.8	7,006,182.5	1,958,831.5	7,007,415.0	SR26	1,972,463.0	7,039,616.0	1,972,083.5	7,040,326.5
SR11	1,965,421.6	7,004,509.5	1,965,558.4	7,008,358.5	SR27	1,952,926.4	7,004,774.5	1,951,859.3	7,003,190.0
SR12	1,971,501.0	7,006,819.0	1,969,213.3	7,007,941.0	SR28	1,944,455.4	7,005,005.5	1,944,302.0	7,002,150.5
SR13	1,973,918.4	7,007,257.5	1,973,983.1	7,010,481.0	SR29	1,953,917.5	6,994,495.0	1,955,630.6	6,993,986.5
SR14	1,984,802.4	7,008,867.5	1,978,226.1	7,012,690.0	SR30	1,951,017.1	6,985,339.5	1,952,135.5	6,985,582.0
SR15	1,986,840.6	7,018,607.0	1,980,985.4	7,019,959.5	SR31	1,998,062.5	7,040,063.5	1,996,131.6	703,994.0
SR16	1,990,781.3	7,024,831.0	1,987,942.3	7,027,204.5					

TWDB Survey January 2005

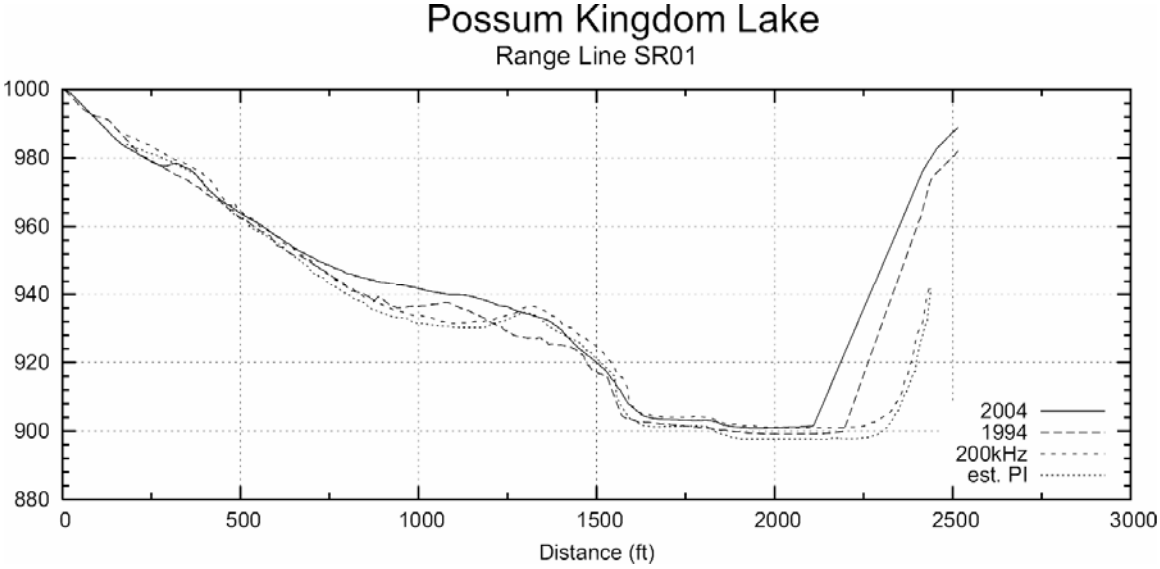


Figure 8. Line Plot of historical sediment range line SR01.In all of the following line plots, “est. PI”, is the interpreted pre-impoundment surface.

Sediment thickness in the main channel at Range Line SR01 is interpreted to be 3 to 4 feet. However, a difference of 18.7 ft between the invert elevation (874.8 ft) and the minimum depth found during the survey (893.5 ft), suggests there is a significant deposit of sediment near the dam. The invert is approximately 8,000 ft down stream from Range Line SR01.

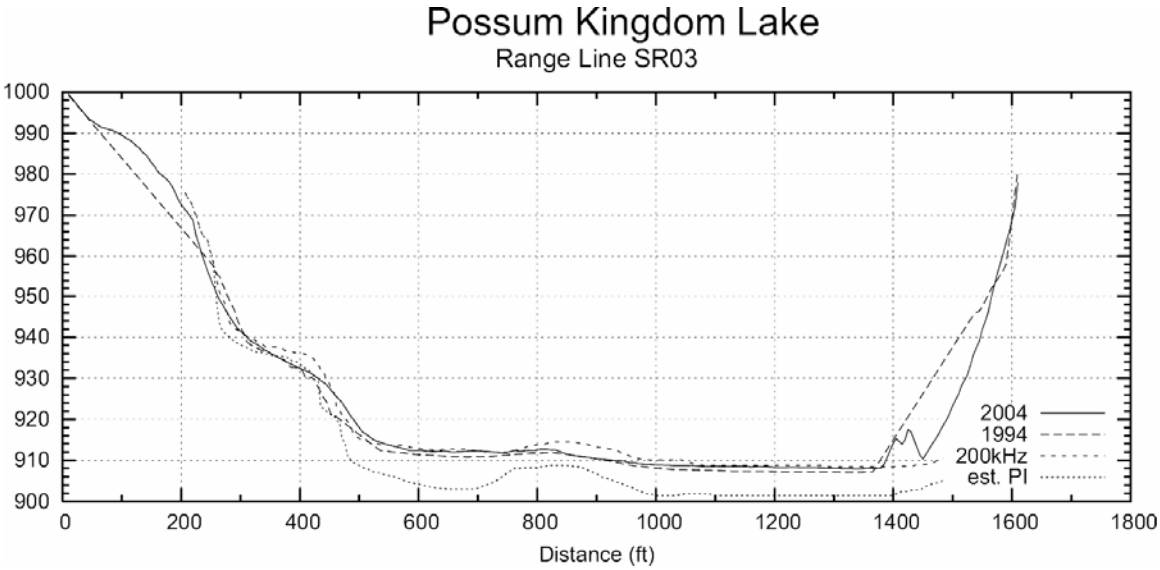


Figure 9. Line Plot of historical sediment range line SR03. Sediment thickness in the main channel at Range Line SR03 is interpreted to be approximately 7 to10 feet.

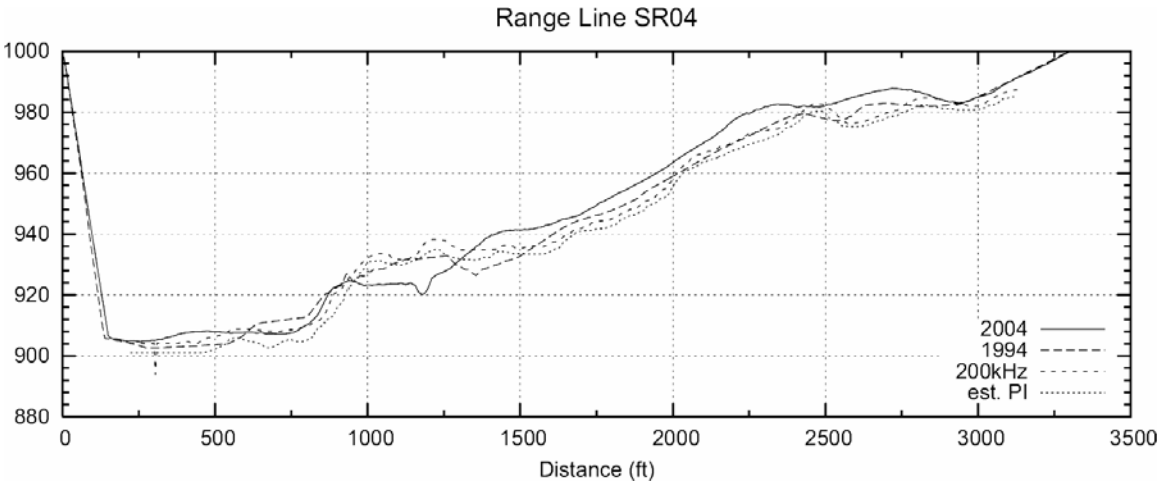


Figure 10(a). Line Plot of historical sediment range line SR04.

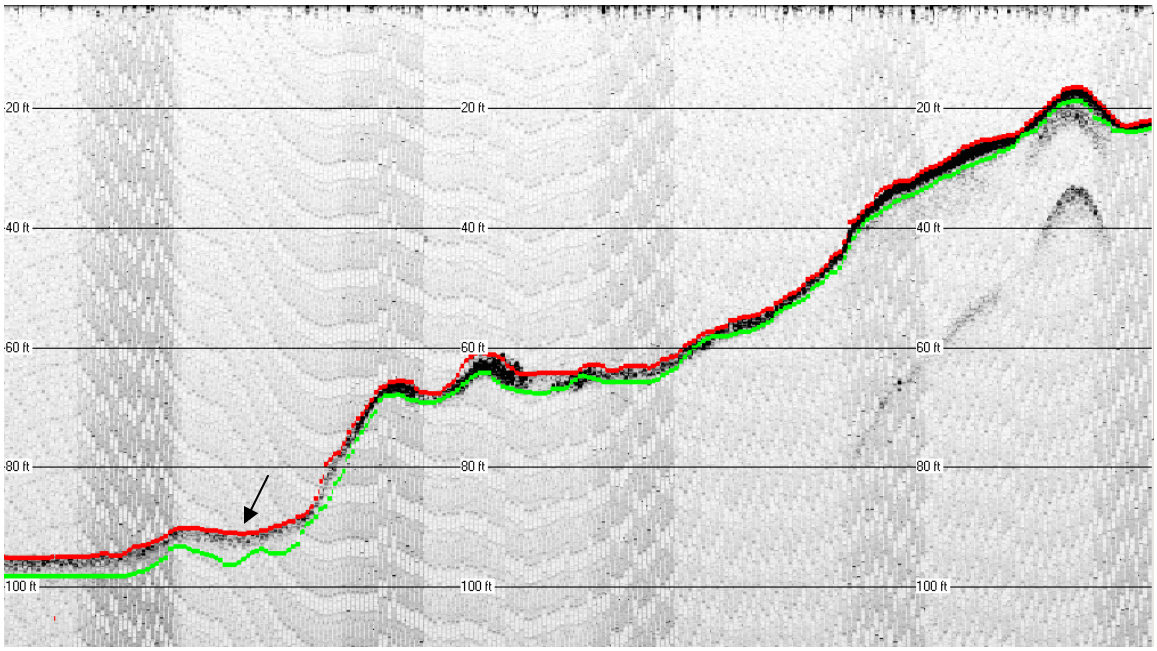


Figure 10(b). Multi-frequency Profiler display of SR04.

Sediment thickness in the main channel at Range Line SR04 is interpreted to range between approximately 3.5 to 6 feet. The arrow in the figure above is pointing out a pocket of sediment interpreted to be 6 ft thick.

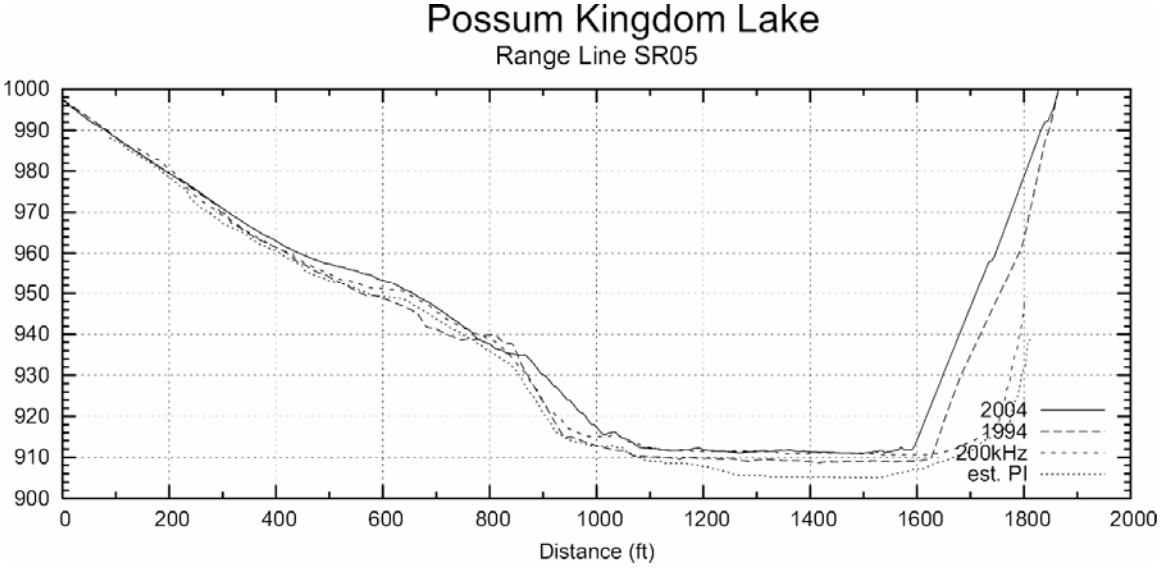


Figure 11. Line Plot of historical sediment range line SR05.

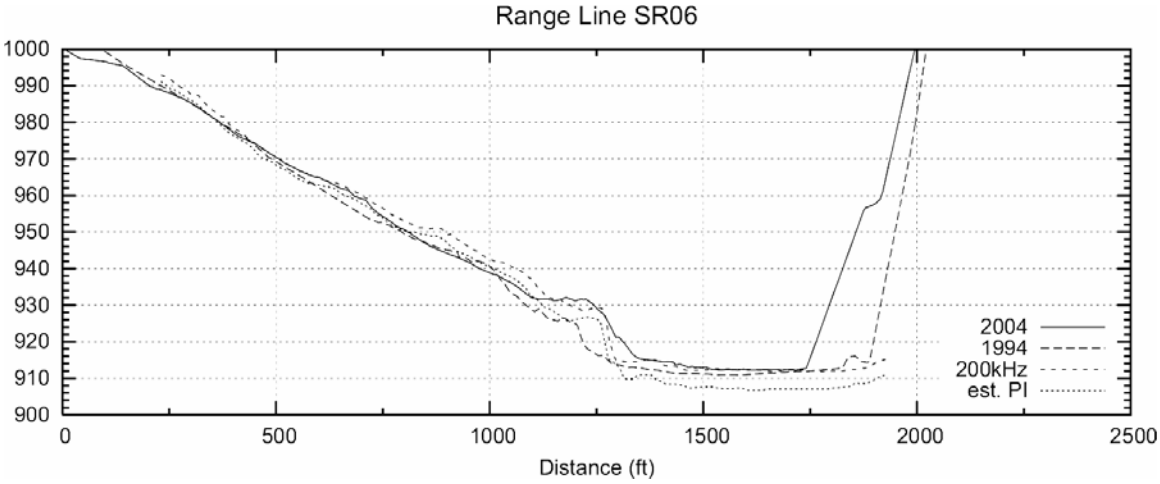


Figure 12. Line Plot of historical sediment range line SR06.

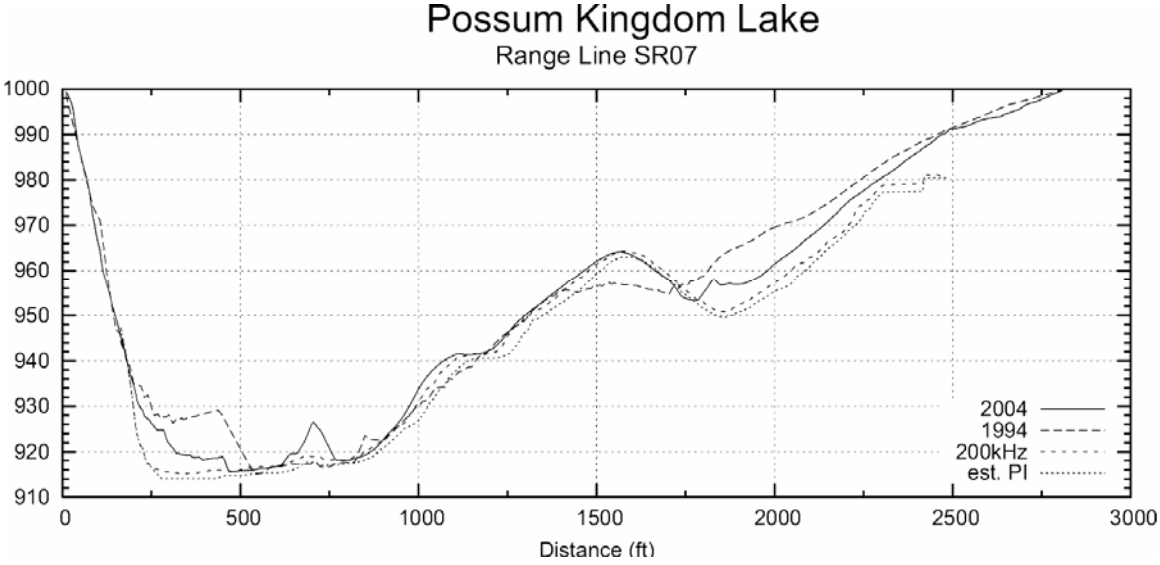


Figure 13. Line Plot of historical sediment range line SR07.

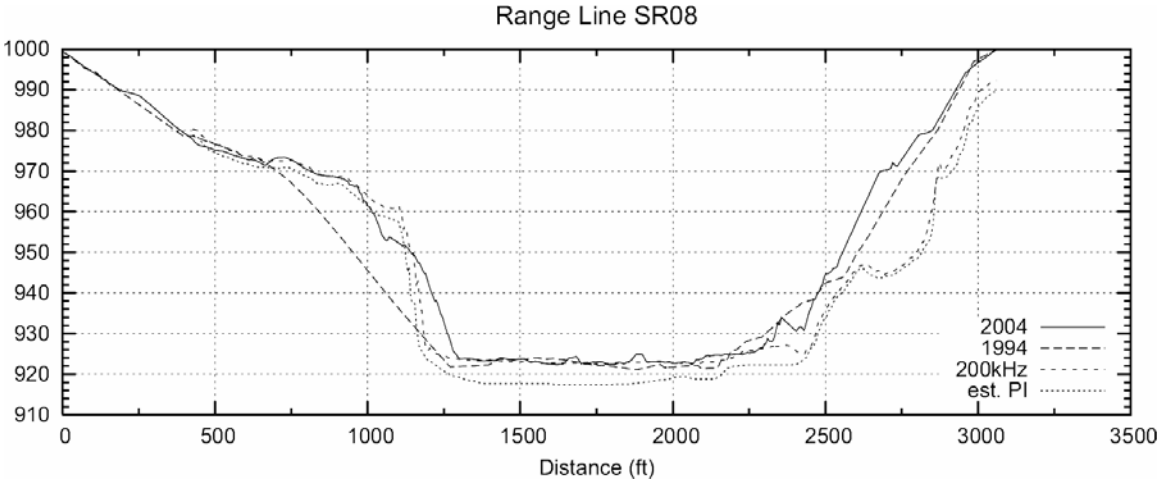


Figure 14. Line Plot of historical sediment range line SR08.

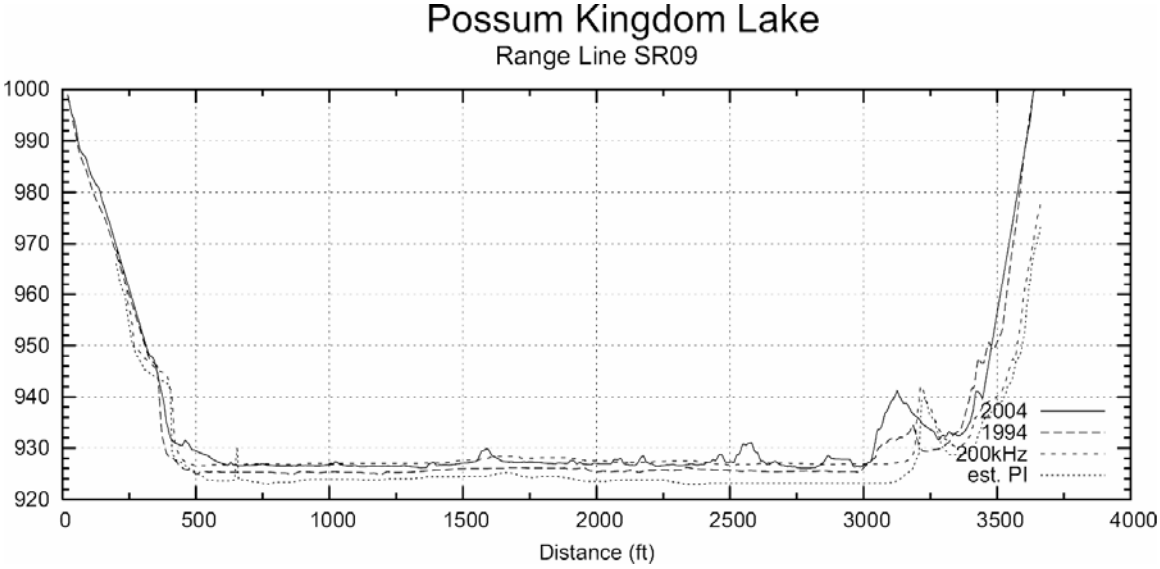


Figure 15(a). Line Plot of historical sediment range line SR09.

Figures 15(b), 15(c), and 15(d) are presented to illustrate the weighting ability of the processing software. The darker red layer in each plot is associated with the 200 kHz signal and most likely represents an unconsolidated layer of “fluff” with high water content.

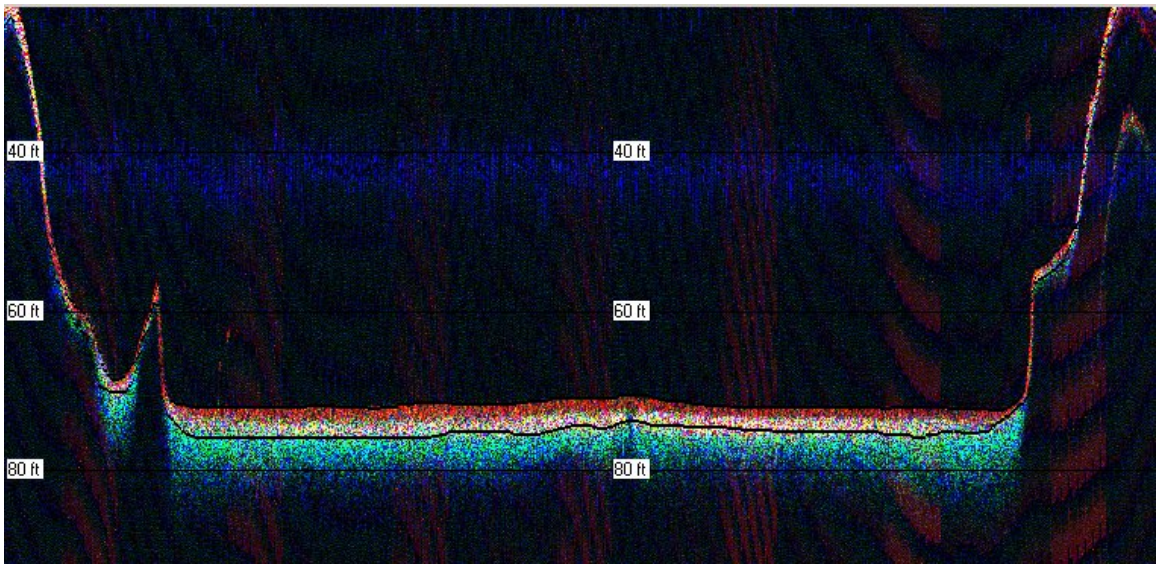


Figure 15(b). Multi-frequency Profiler display of SR09.

Range Line SR09 was driven from right bank to left bank; therefore the multi-frequency plot is plotted in reverse.

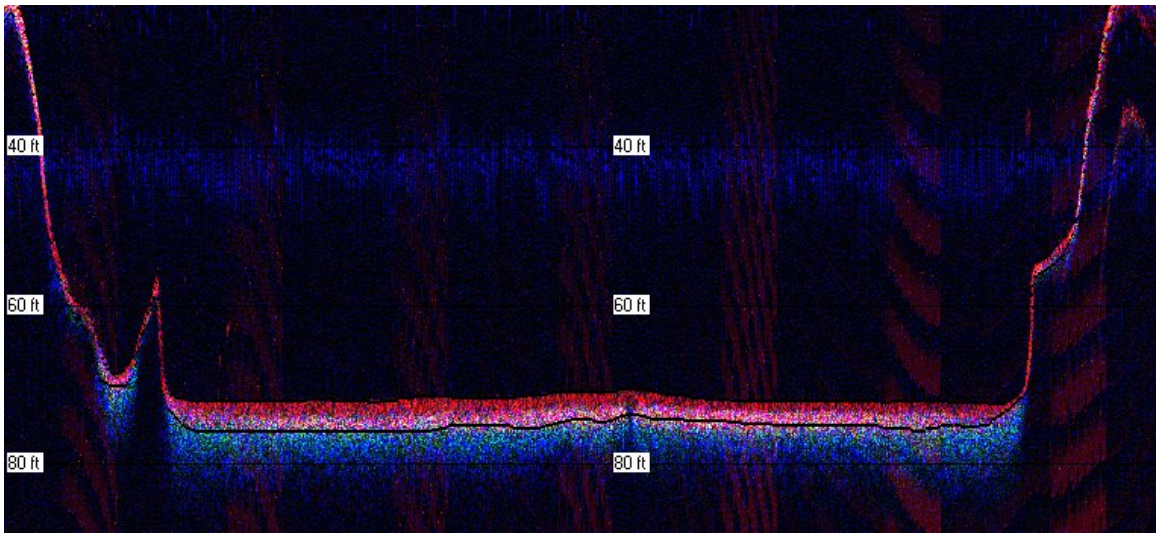


Figure 15(c). Multi-frequency Profiler display of SR09.

The continued adjustment of the display-weighting scheme continued to reveal what appears to be a second layer beneath the top “fluff” layer. Most likely this layer would have less water content and possibly larger gain size sediments.

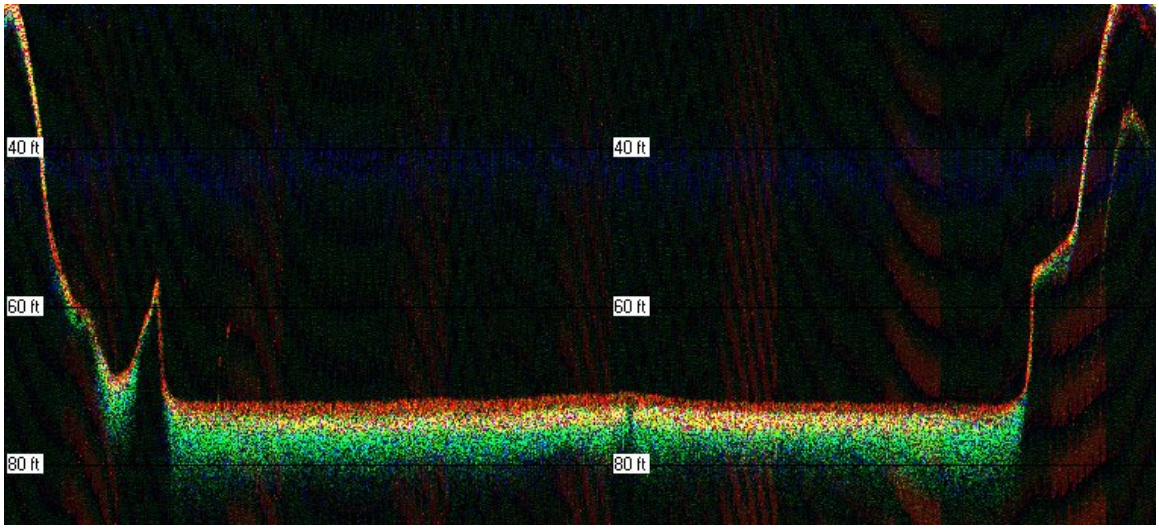


Figure 15(d). Multi-frequency Profiler display of SR09.

Sediment thickness in the main channel at Range Line SR09 is interpreted to be approximately 4 feet. By varying the weight or gain given to each frequency, the return signal sensitivity is adjusted in order to highlight various parts of the sediment layer.

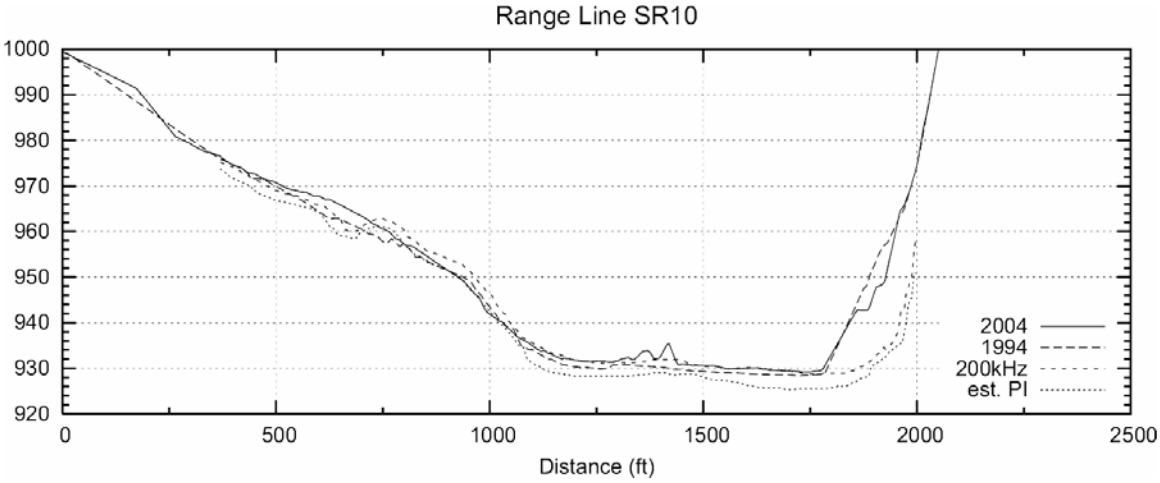


Figure 16. Line Plot of historical sediment range line SR10.

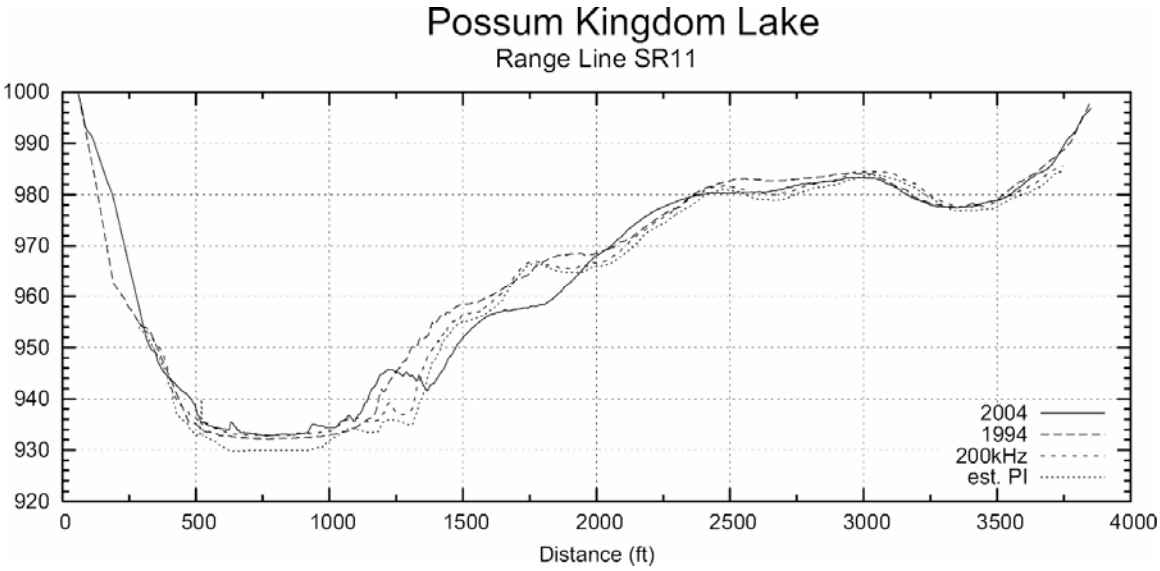


Figure 17. Line Plot of historical sediment range line SR11.

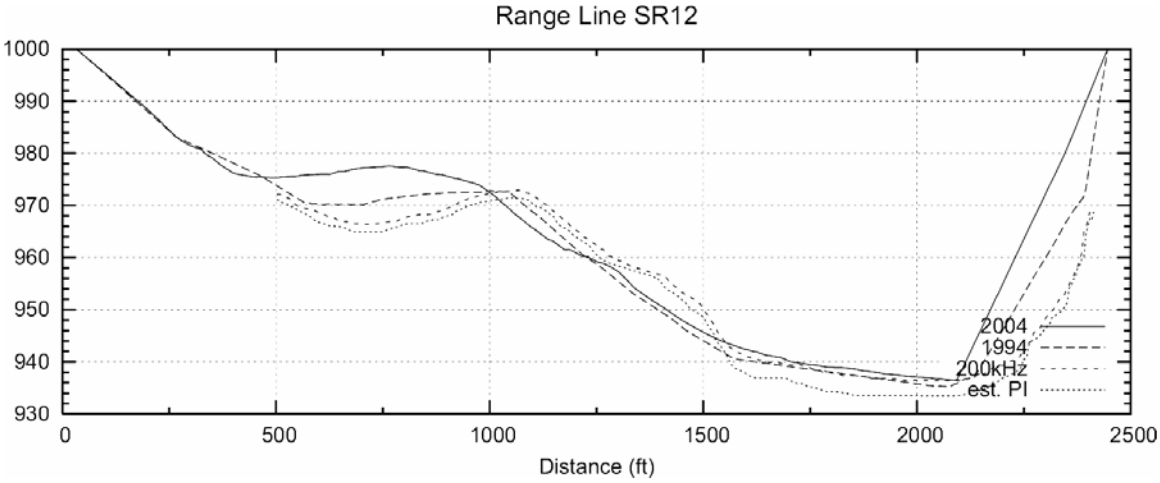


Figure 18. Line Plot of historical sediment range line SR12.

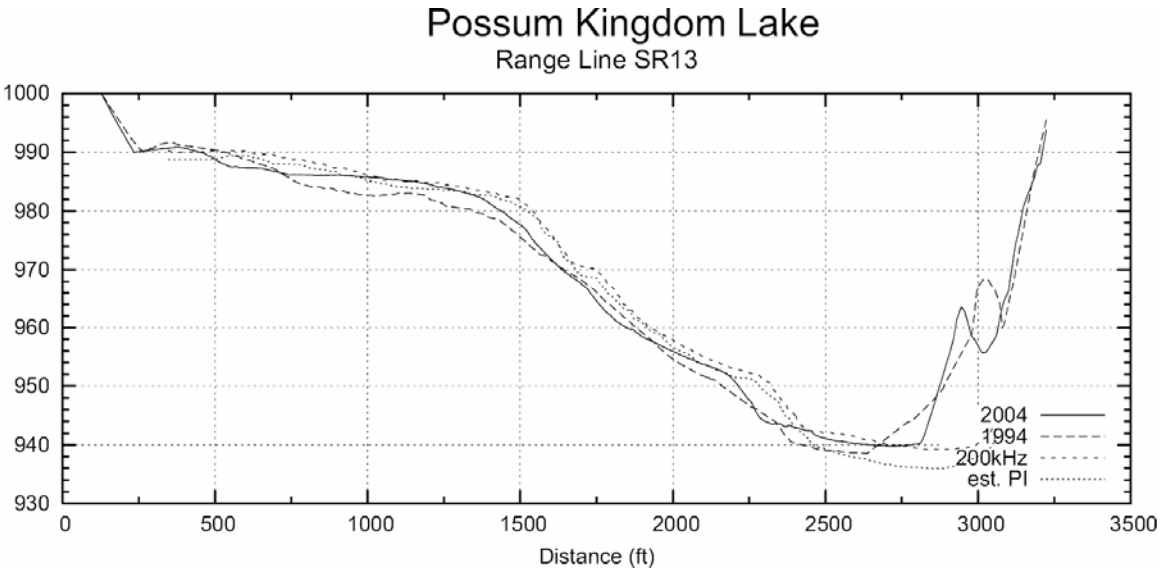


Figure 19. Line Plot of historical sediment range line SR13.

Range Line SR14 bisected Costello Island therefore; data were collected in two separate files. The range line was driven from the right bank to the west side of Costello Island. Sediment thickness in the old stream channel (white arrow) approaching the west bank of Costello Island is estimated to be about 4 ft. (See Figures 20(a) and 20(b))

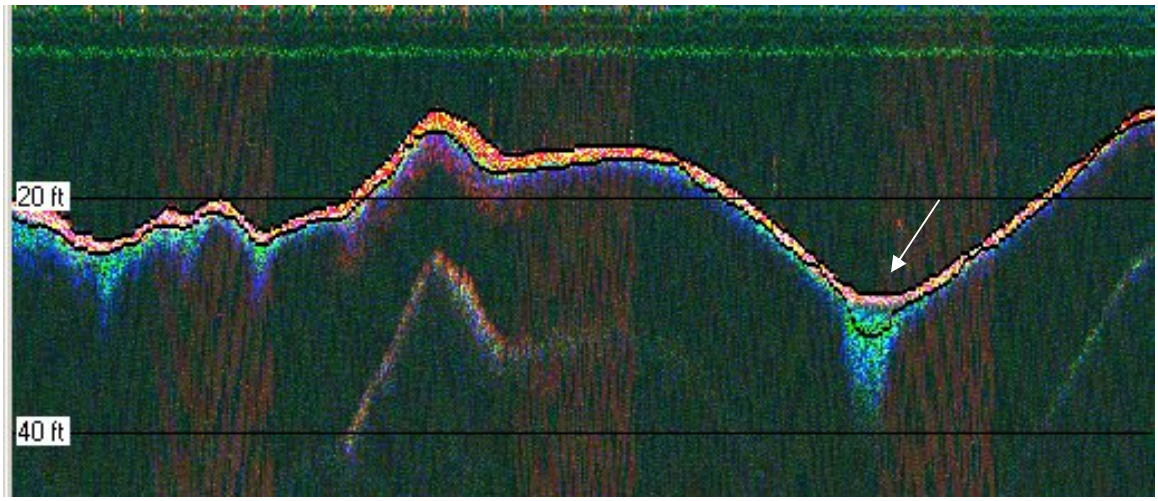


Figure 20(a). Multi-frequency Profiler display of the western portion of Range Line SR14.

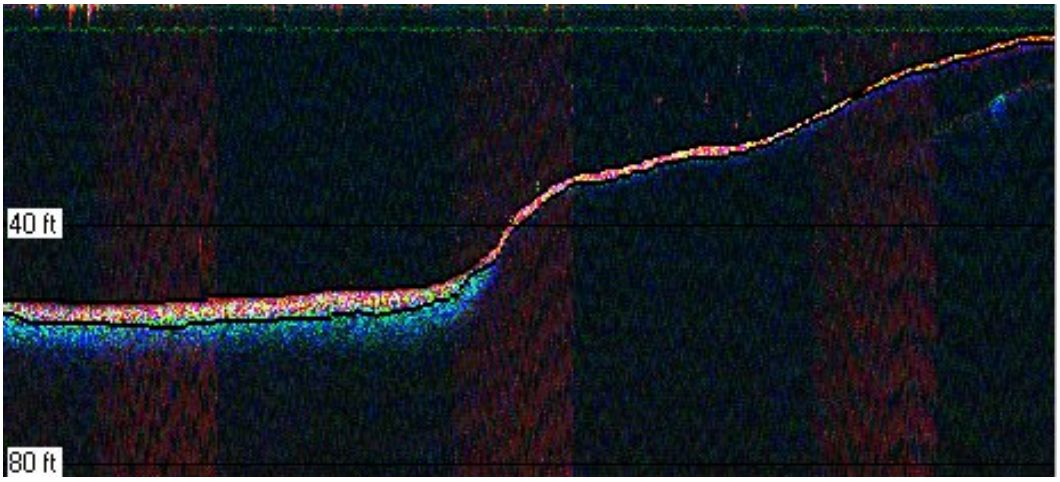


Figure 20(b). Multi-frequency display of the eastern portion of Range Line SR14. The boat was driven from the left bank to the east side of Costello Island. Sediment thickness in the primary stream channel is interpreted to be approximately 5 ft.

Data for Range Line SR15 were also collected in two files and are displayed below.

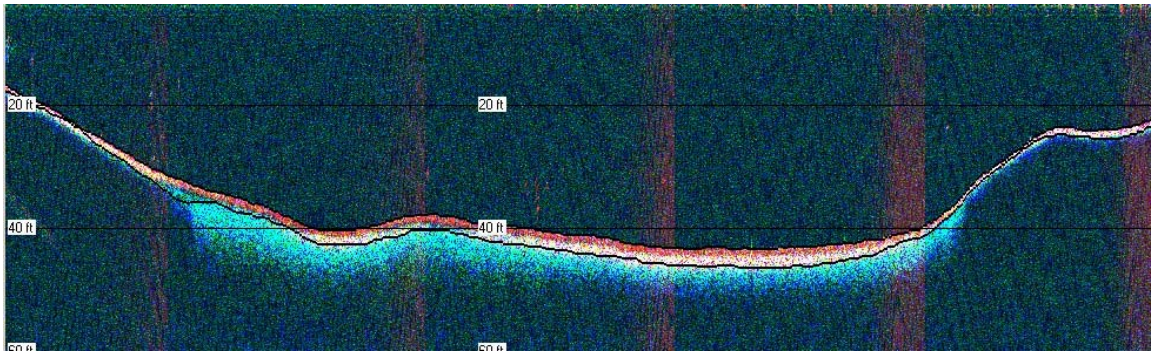


Figure 21(a). Multi-frequency display of eastern portion of Range Line SR15.

In the figure above, the boat is traveling from the right bank towards the center of the reservoir approaching the erosional remnant evident in the 1953 photograph (Figure 22 and 23, page 21). Sediment along this path is estimated to be 3 to 4 ft thick.

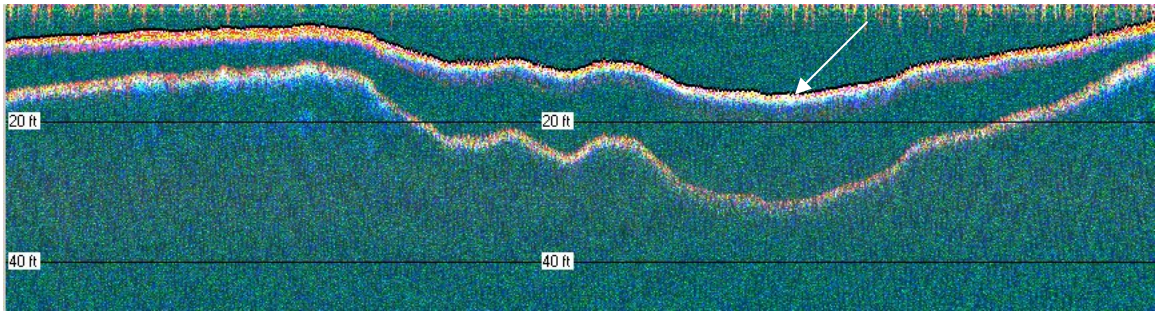


Figure 21(b). Multi-frequency display of western portion of Range Line SR15.

The display in Figure 21(b) is still traveling from the right bank towards the left bank starting approximately in the center of the reservoir. (See Figure 22 on page 21.) There appears to be very little sediment built up on and near the erosional remnant, visible in Figure 23 next page, and approximately 2 ft of sediment in the topographic low (white arrow) between the start of the transect and the left bank which appears on the right side of Figure 21(b) above.

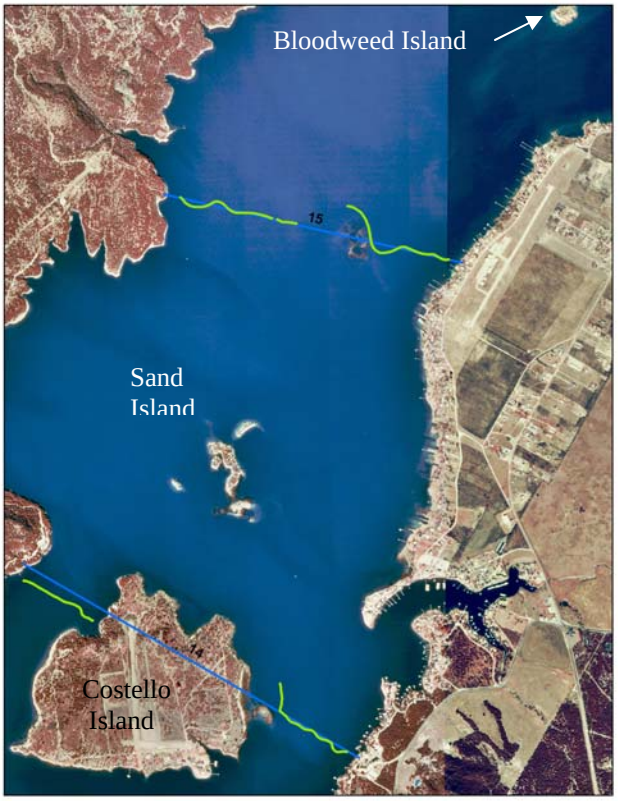


Figure 22.
The boat path shown in green, along the blue Range Lines SR14 and SR15, were driven around Costello Island and a shallow spot in what was the historic river channel. These shallow spots, which appear to be a line of erosional remnants characteristic of river channel morphology, run from Sand Island, just north of the large Costello Island, along the left bank to Bloodweed Island, located in the upper right corner of the photograph. The photograph at left was taken January 23, 1995 when the water surface elevation in the reservoir was 997.34 ft.

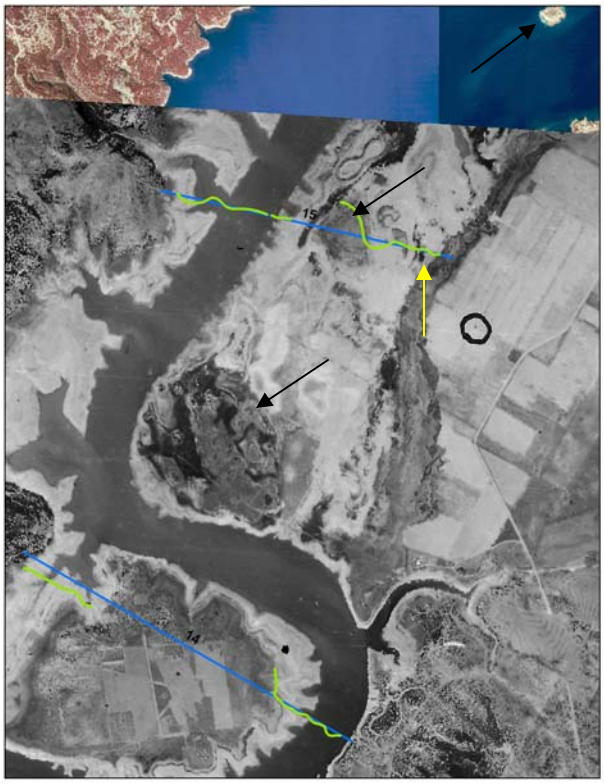


Figure 23.
The same data as in Figure 21 above, superimposed on an April 13, 1953 photograph, while the reservoir was at elevation[9] 967.5 ft or 32.5 ft below CPE. The black arrows are pointing to erosional remnants that where encountered during the TWDB survey. Little or no sediment was detected in these areas, while approximately 2 ft of sediment was interpreted to be in the area closer to the reservoir's left bank (near yellow arrow). See Figures 21(a) and 21(b) page 20 for multi-frequency display.

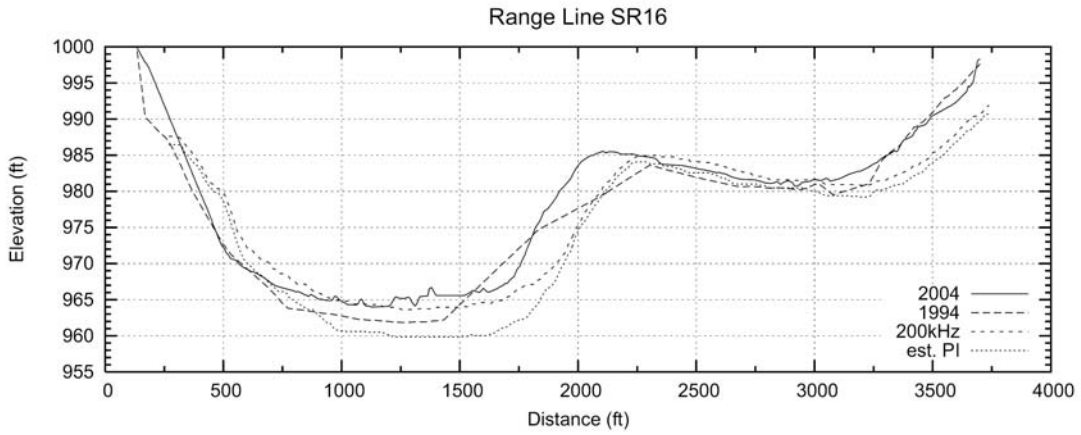


Figure 24(a). Line Plot of historical sediment range line SR16.

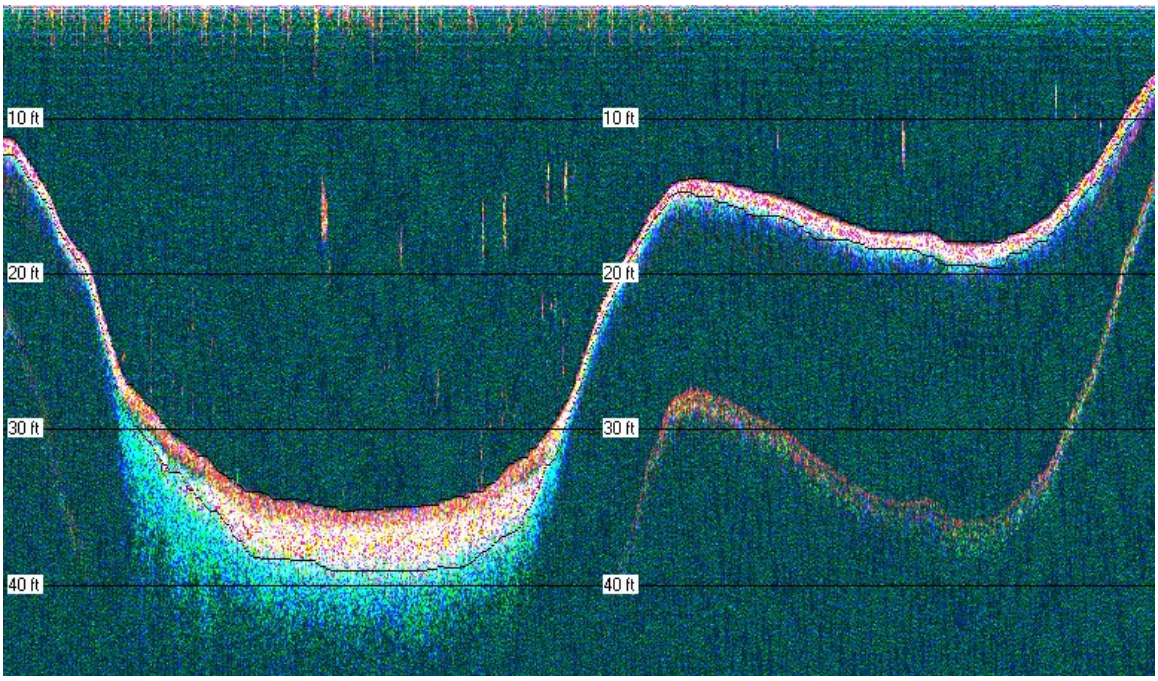


Figure 24(b). Multi-frequency Profiler display of SR16. Sediment thickness in the main channel at Range Line SR16 is interpreted to be approximately 4 feet.

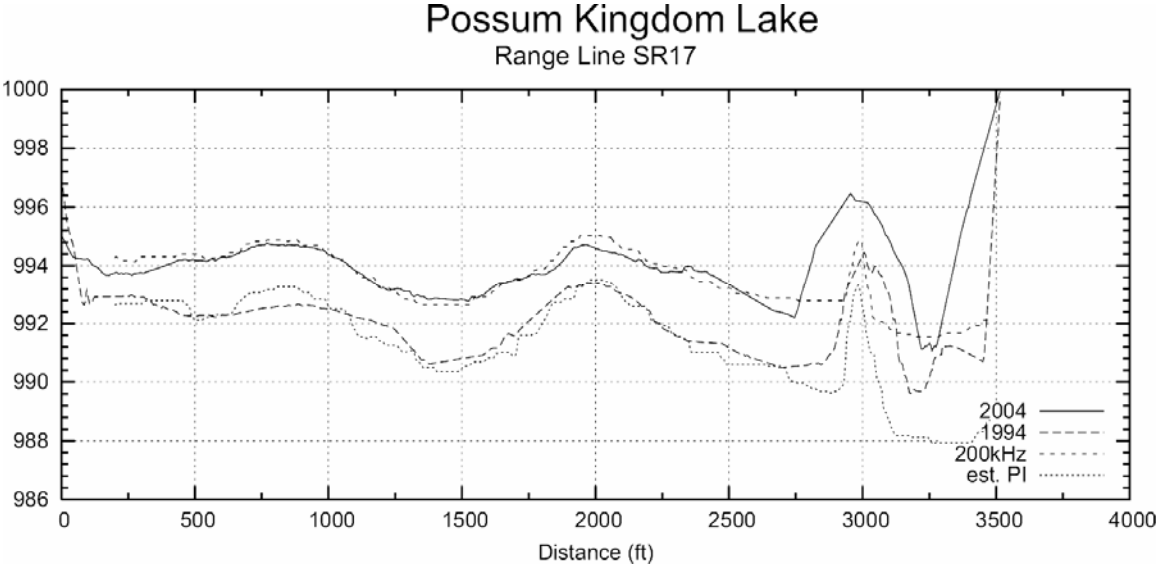


Figure 25(a). Line Plot of historical sediment range line SR17.

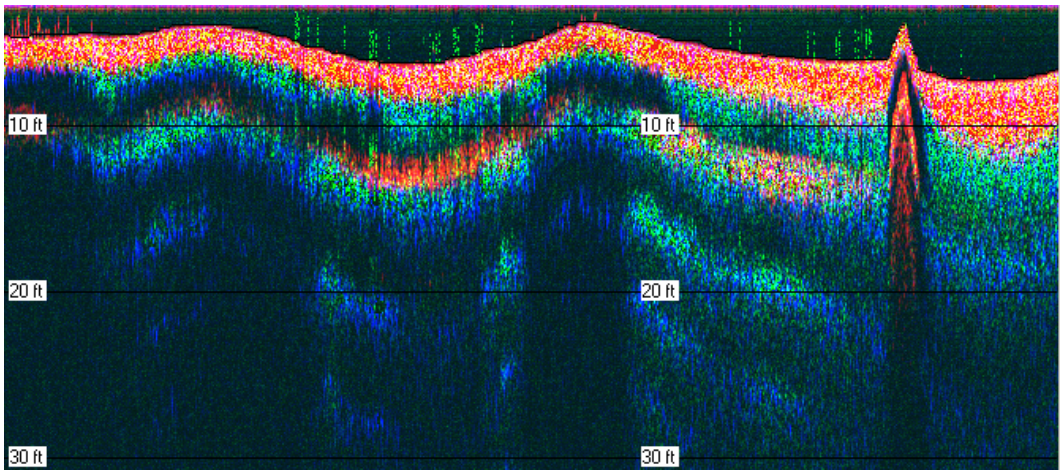


Figure 25(b). Multi-frequency Profiler display of Range Line SR17.

Sediment thickness in the main channel at Range Line SR17 is interpreted to be approximately 2.5 ft

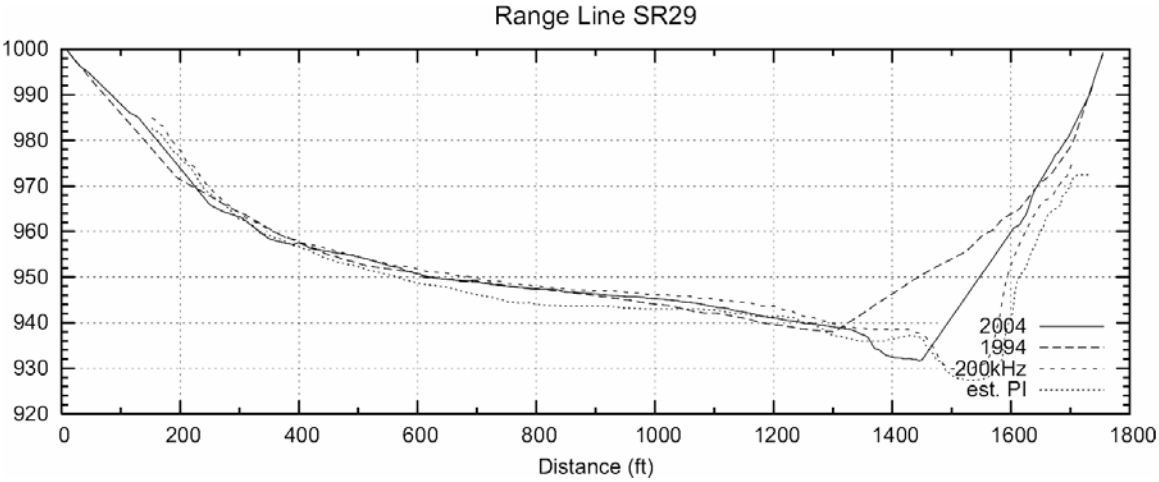


Figure 26. Line Plot of historical sediment range line SR29.

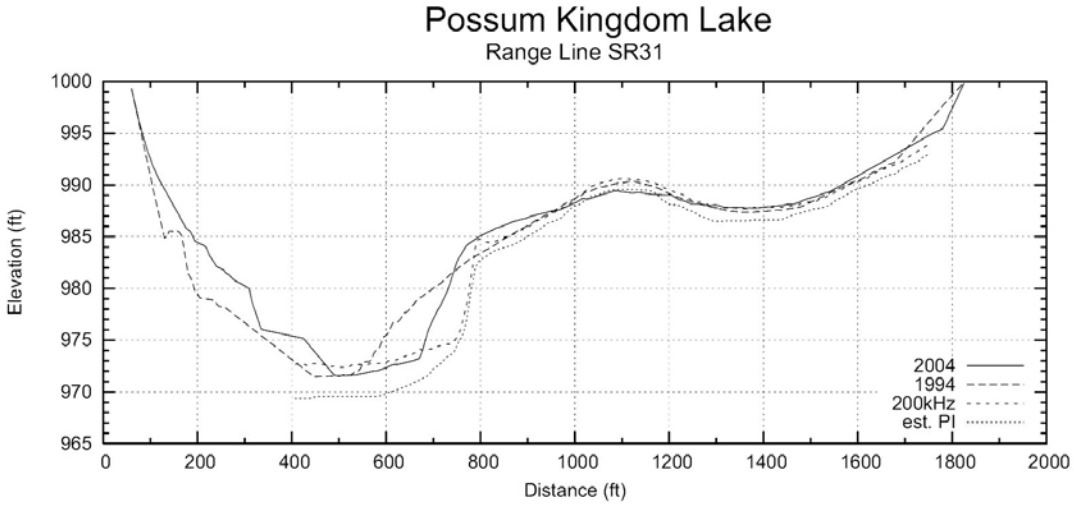


Figure 27(a). Line Plot of historical sediment range line SR31.

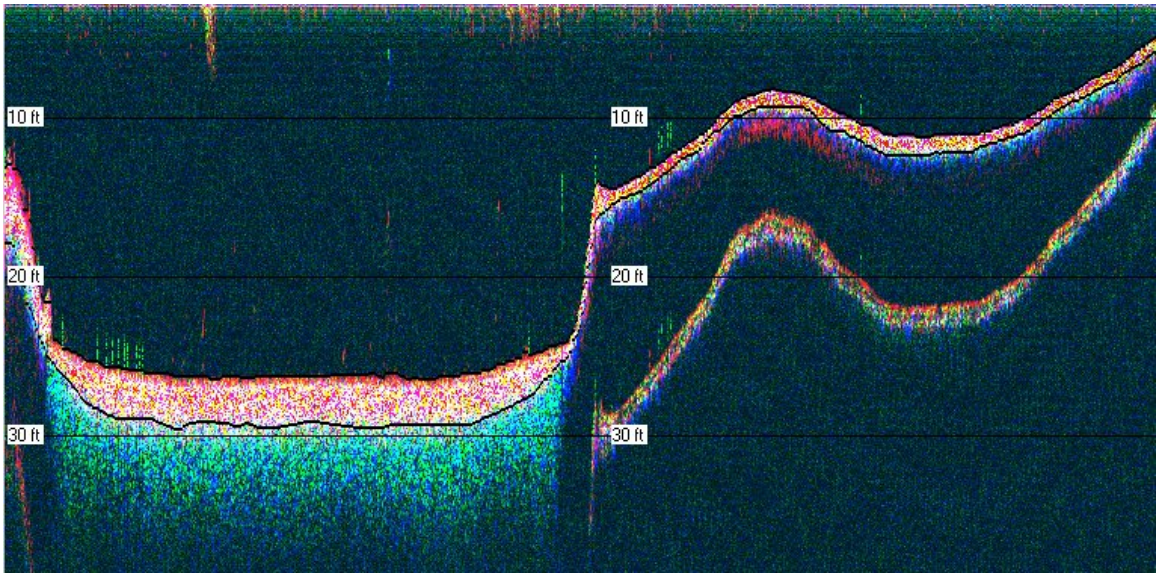


Figure 27(b). Multi-frequency Profiler display of SR31. Sediment thickness in the main channel at Range Line SR31 is interpreted to be approximately 3 feet. Range Line SR31 is located in the Rock Creek arm of Possum Kingdom.

Range Lines SR18 through SR25 continue upstream in the reservoir where it becomes more riverine in character. They were driven with the multi-frequency profiler and sediment thickness was interpreted to range from approximately 3 ft to 4 ft thick along those lines. However, the river is becoming infested by salt cedar and the survey team was not able to make a complete transect of the river in many places.

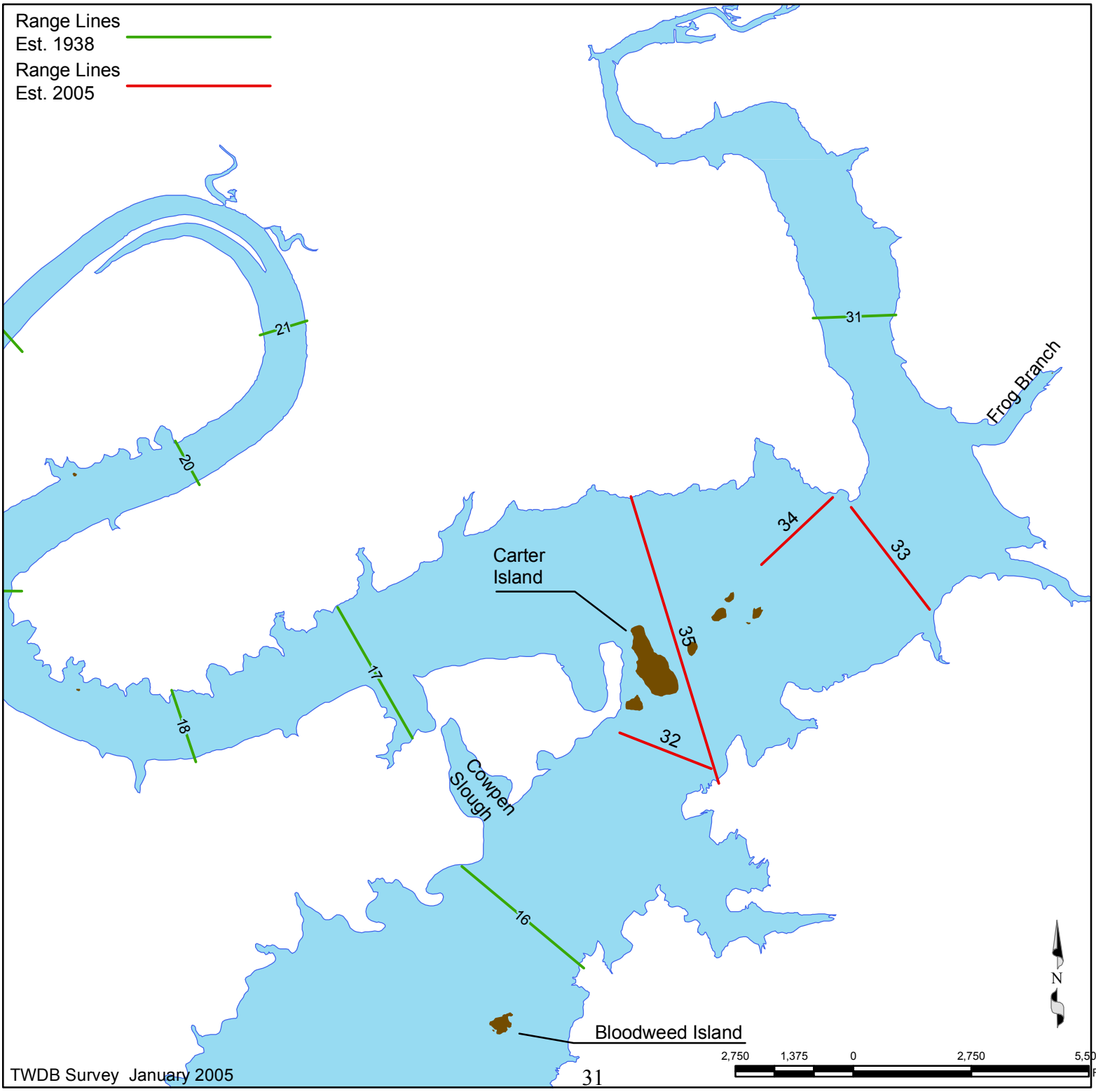
The TWDB survey crew established 4 additional range lines for the 2004-2005 survey to investigate sedimentation in the vicinity of Carter Bend, Carter Island, and the confluence of Rock Creek. Figure 28, on the following page, shows the location of these range lines and includes Table 4, a list of the coordinate endpoints.

Figure 28

POSSUM KINGDOM LAKE

Location of Sediment Range Lines Est. 2005
by the TWDB in the Carter Bend Area

Table 4. Sediment Range Line Endpoints Est. 2005				
Sediment Range Line	X_L	Y_L	X_R	Y_R
SR32	1,993,759.3	7,029,480.0	1,991,623.1	7,030,316.5
SR33	1,998,850.3	7,033,202.0	1,997,017.6	7,035,582.5
SR34	1,996,589.4	7,035,813.5	1,994,928.0	7,034,246.5
SR35	1,991,878.4	7,035,828.5	1,993,934.1	7,029,139.0
NAD83 State Plane Texas North Central (feet) $_L$= Left $_R$=Right				



TWDB Survey January 2005

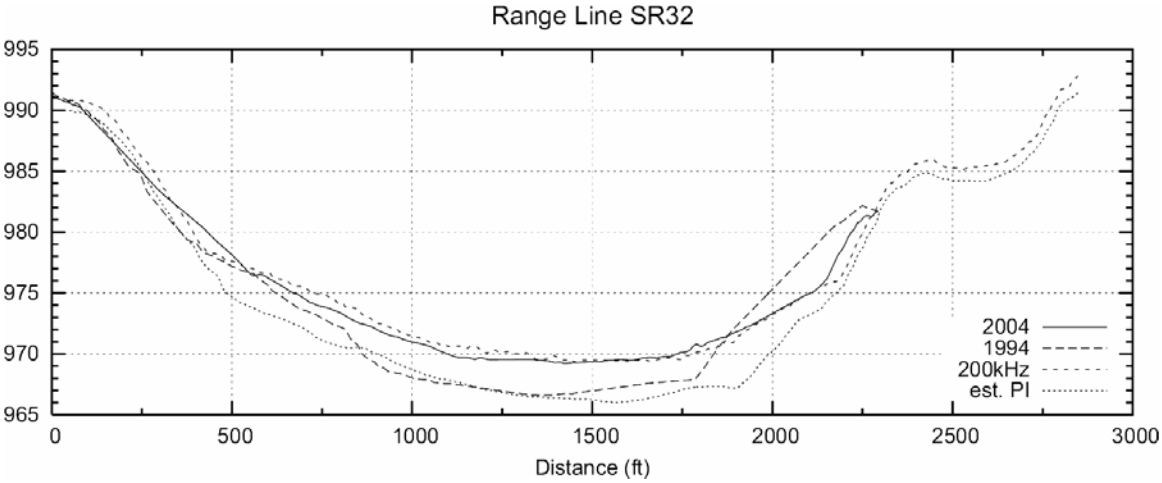


Figure 29(a). Line Plot of additional sediment range line SR32.

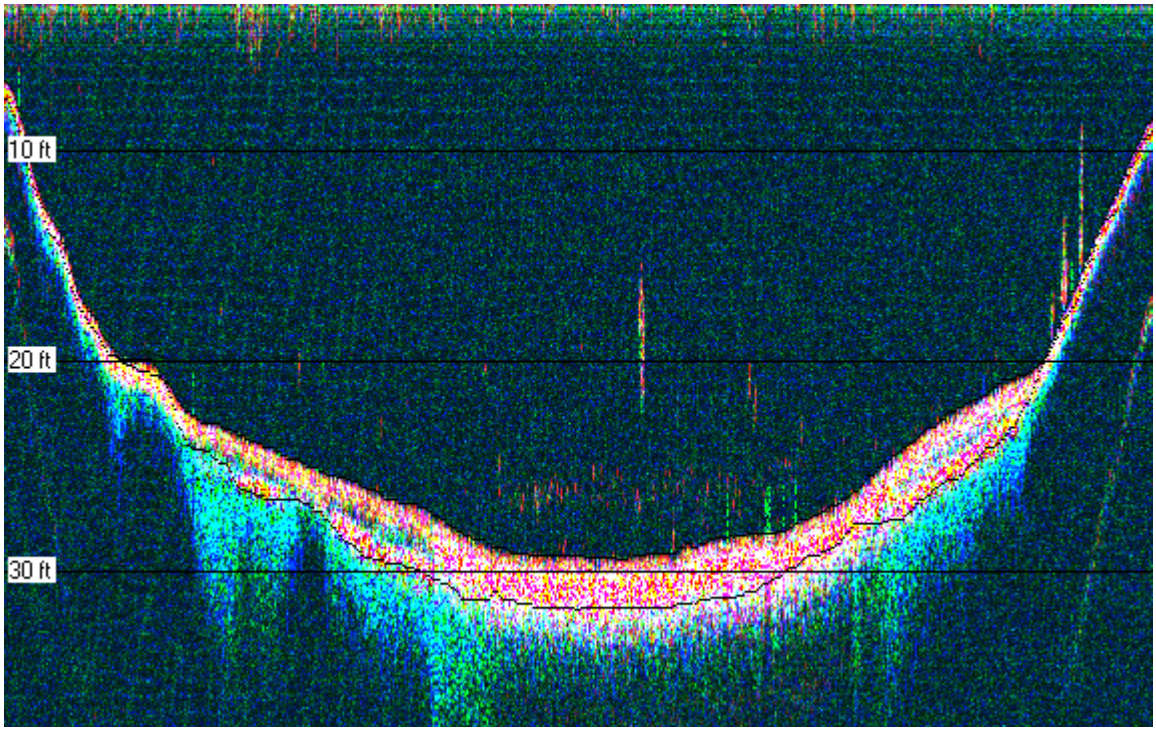


Figure 29(b). Multi-frequency Profiler display of SR32. Range Line SR32 was driven from right bank to left bank; therefore the multi-frequency plot is plotted in reverse from the line plot above. Sediment thickness in the main channel at Range Line SR32 is interpreted to be approximately 3 feet.

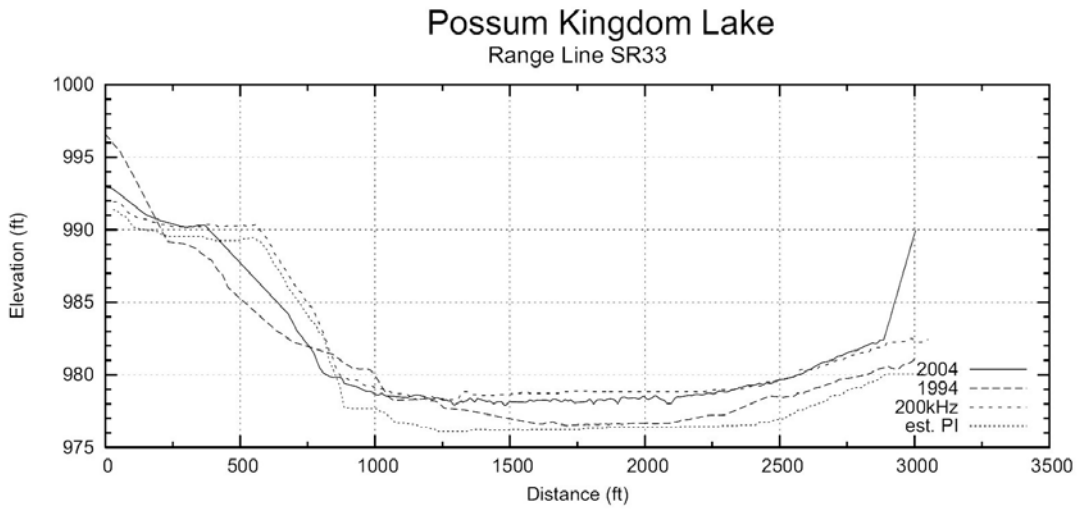


Figure 30(a). Line Plot of additional sediment range line SR33.

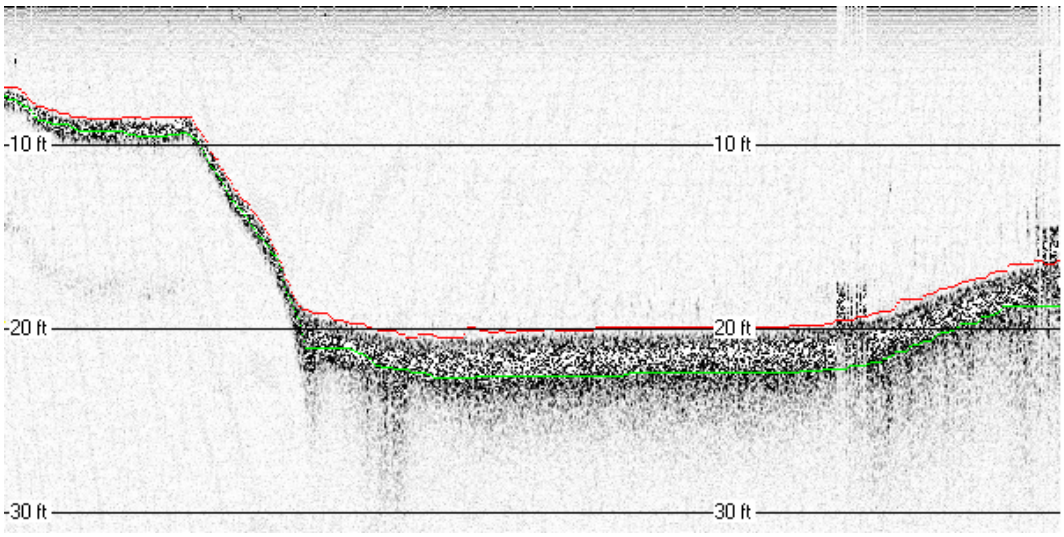


Figure 30(b). Multi-frequency Profiler display of SR33. Sediment thickness in the main channel at Range Line SR33 is interpreted to be nearly 3 feet.

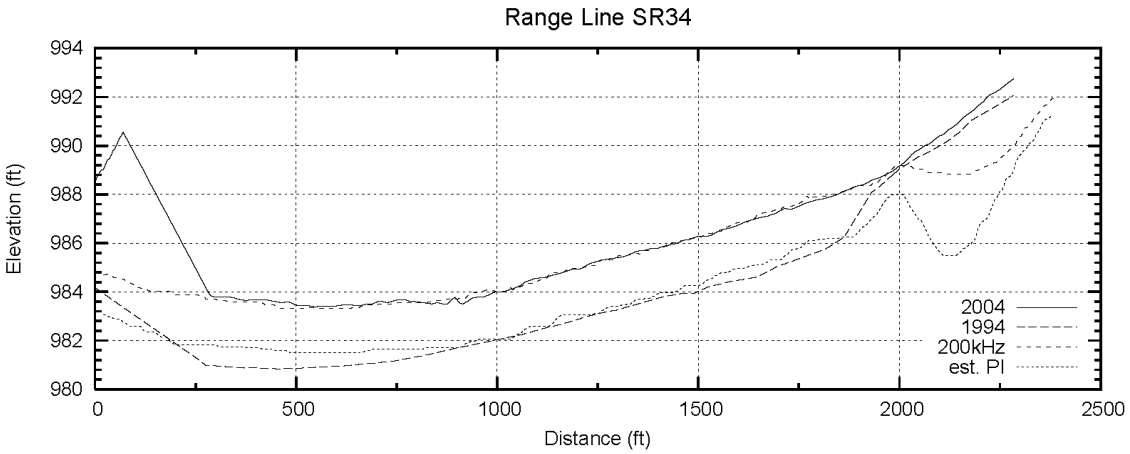


Figure 31(a). Line Plot of additional sediment range line SR34.

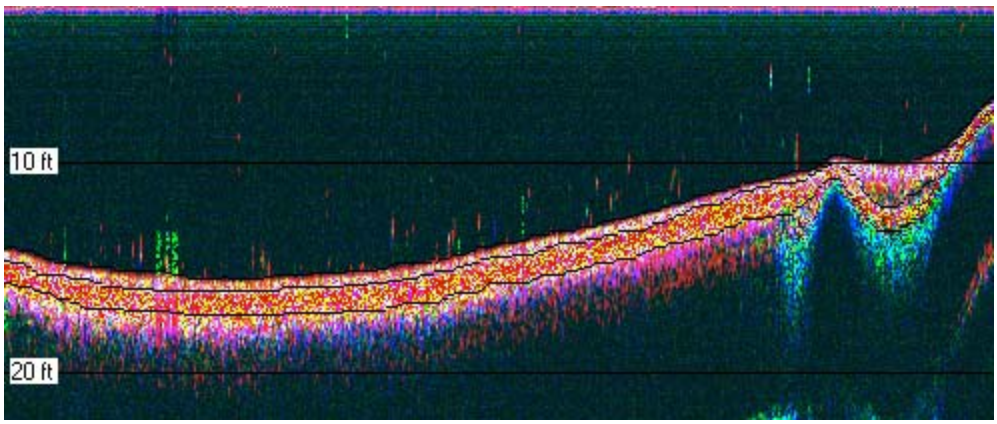


Figure 31(b). Multi-frequency Profiler display of SR34. Sediment thickness in the main channel at Range Line SR34 is interpreted to be approximately 2 feet.

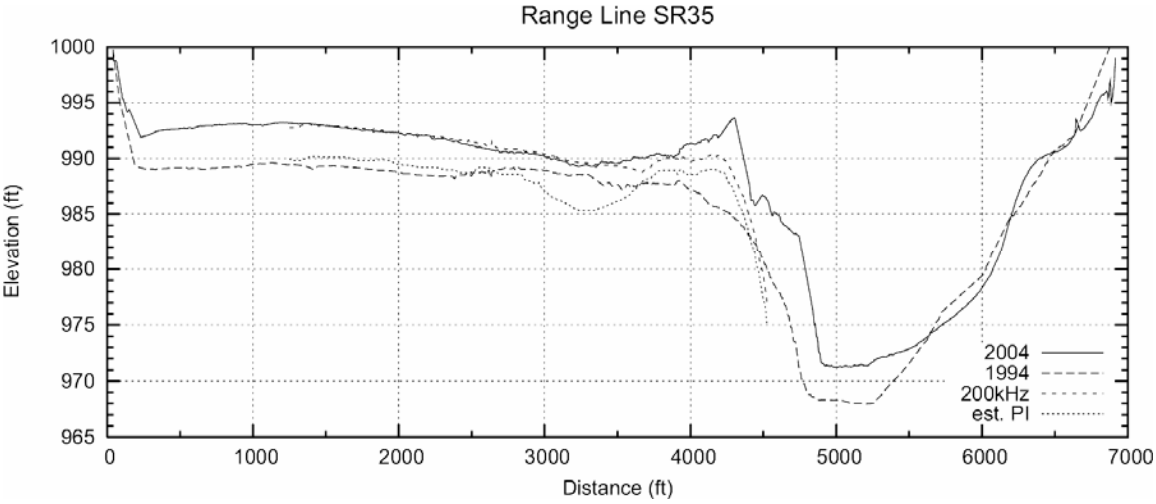


Figure 32(a). Line Plot of additional sediment range line SR35.

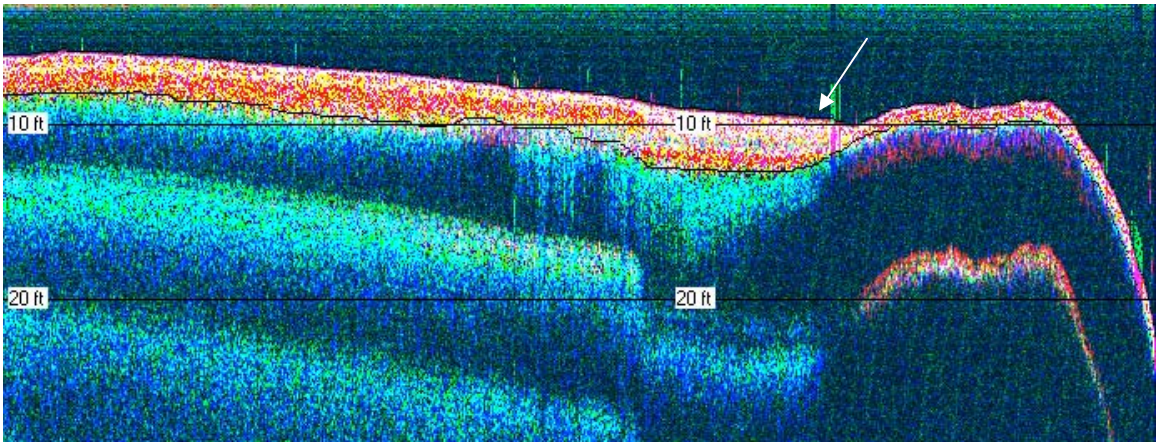


Figure 32(b). Multi-frequency Profiler display of SR35. The white arrow in the multi-frequency display of Range Line SR35 is highlighting an area were the sediment thickness is estimated to be 4 feet. Figure 33 on the next page shows the approximate location of this sediment.

Figure 33. Sediment thickness at Range Line SR35 is interpreted to range between approximately 3 ft to 4 ft. The arrow in the figure above corresponds with the pocket of thickest sediment represented by the arrow in Figure 32(b) on the previous page. The area in the figure above is Carter Bend with the water surface elevation at 997.35ft.

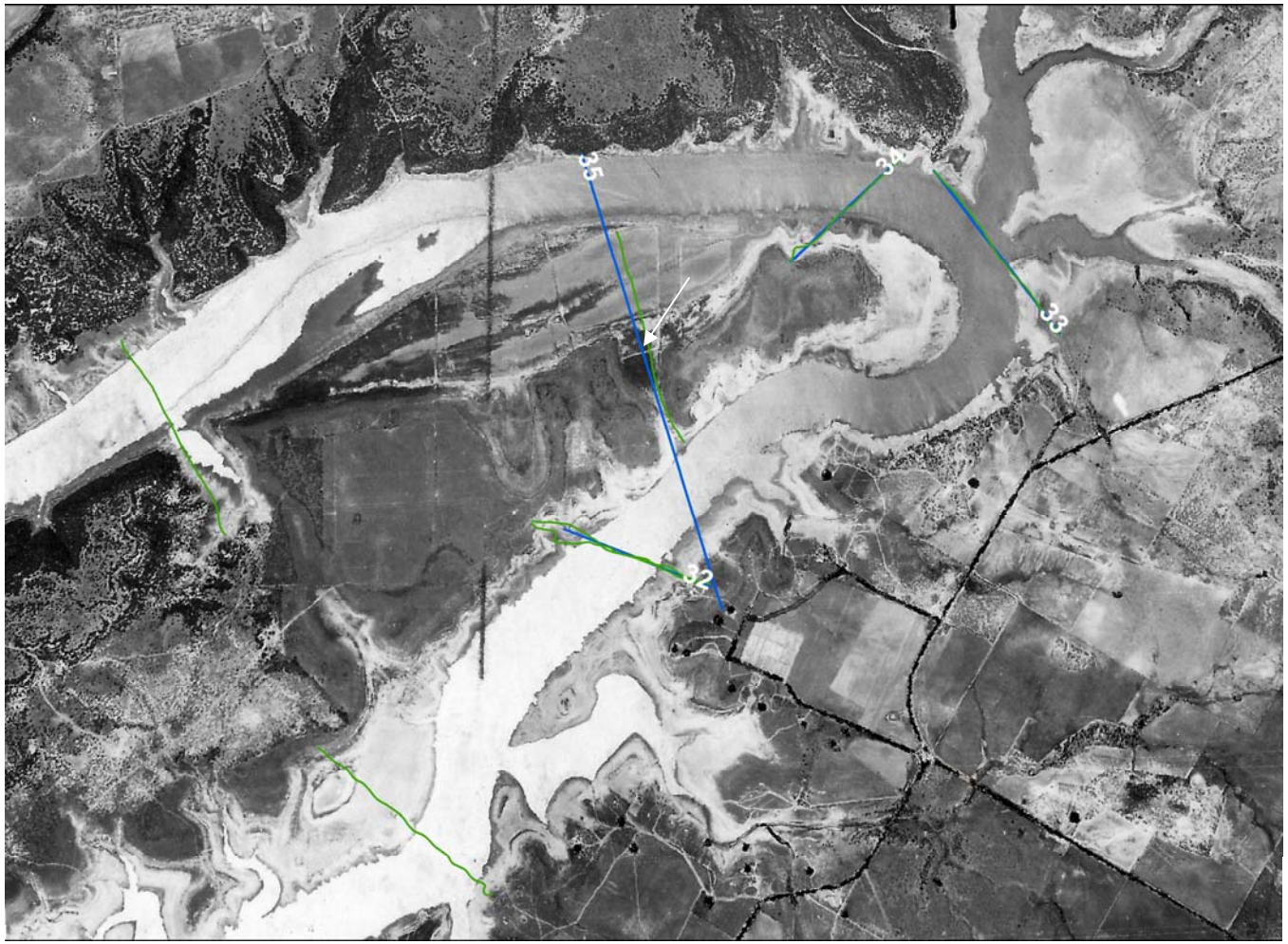


Figure 34. In the April 13, 1953 photograph of the same area in Figure 33, the 4 additional range lines (SR32, SR33, SR34, and SR35) created for this report are shown in blue with the boat path plotted in green. The reservoir elevation[9] was 967.5 ft.

Brazos River Measurements

The survey crew traveled an additional 14 river miles upstream beyond the modeled reservoir boundary, and collected over 8,400 data points in 4.5 hours of data collection. When the crew reached the point where FM 1287, south of Graham, TX, crosses the Brazos River it was decided to stop data collection for the day. This data collection exercise was separated from the data for the main body of the reservoir and the volume calculated for the river portion separately. The TIN routine generally performs poorly in riverine topology when the range line spacing is significantly wider than the stream width; therefore the volume calculated for the river portion is a very conservative estimate of the volume of water in this portion of the river. The volume for this portion of the river was calculated from the TIN and estimated to be 1,543 ac-ft.

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2. Brazos River Authority. <www.brazos.org> 19 September 2005.
3. Brazos River Aurthority. Possum Kingdom Lake and Morris Sheppard Dam Pamphlet, 1994.
4. Texas Water Development Board. 1966. Report 48. “Dams and Lakes in Texas, Historical and Descriptive Information”
5. United States Geological Survey. Surface Water for Texas. 2004. <http://waterdata.usgs.gov/tx/nwis/sw> 6 June 2005.
6. Texas Water Development Board. 1994, “Volumetric Survey of Possum Kingdom Lake”
7. Blanton III, James O. Bureau of Reclamation. 1982. “Procedures for Monitoring Reservoir Sedimentation”
8. ESRI, Environmental Systems Research Institute, 1995. ARC/INFO Surface Modeling and Display, TIN Users Guide.
9. Brunett, Brad, e-mail to Randall Burns of the Texas Water Development Board. RE: Historical Lake Levels, 07 December 2005.

Appendix A

February 2, 2005
Jordan Furnans

Possum Kingdom Reservoir Hydrographic Survey

Brief description of water surface elevation data: equipment and methods

Three self-contained Solinst water level logging instruments were installed within Possum Kingdom Reservoir to determine the water surface elevation in the vicinity of each instrument. The instruments were installed to account for significant inflow or wind events that may cause the water surface in the upper reaches to be different than the water surface recorded by the USGS gauge located near the dam. Table 1 describes the location where each logger was installed.

Table 1 – Location of water level logging instrumentation

Location	Install Date	Retrieval Date
Rock Creek	12/10/04 11:15 AM	1/14/05 7:45 AM
Sandbar Village	12/10/04 12:15 PM	1/14/05 8:08 AM
Dam Intake	12/14/04 10:45AM	1/12/05 3:45 PM

Each instrument, a Solinst Levellogger Model 3001, consisted of one pressure transducer mounted within a PVC pipe and attached to steel poles with cable ties. The pressure transducer was installed below the water surface with the top of the pole visible for retrieval purposes.

The water surface elevation at each instrument location was determined indirectly based upon the USGS Possum Kingdom Lk nr Graford, TX, gauge number 08088500. The height of water above each gauge used for this study is shown in Figure 1.

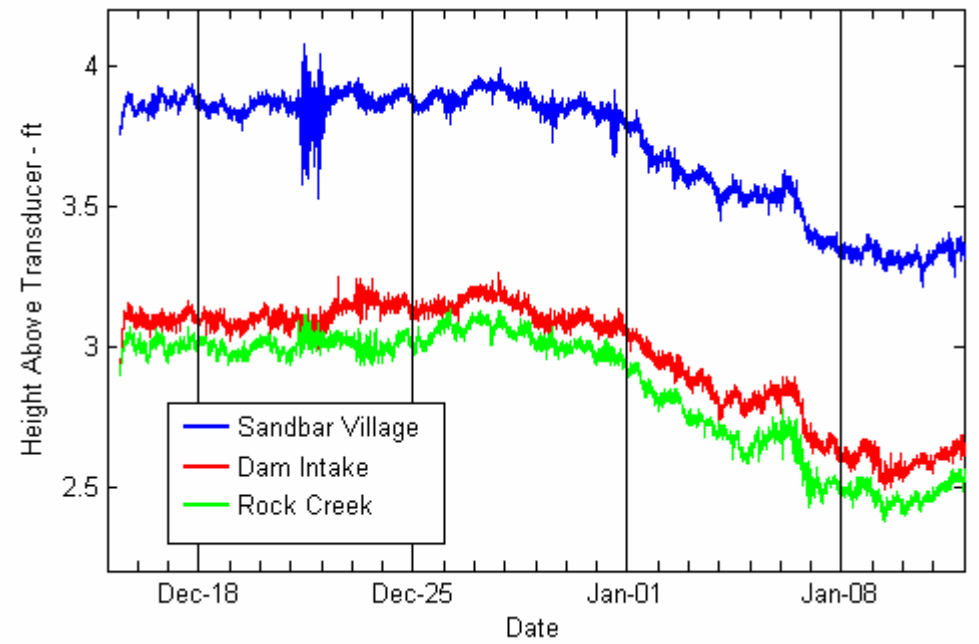


Figure 1 – Water height above the pressure transducers

A simple method was used to determine water surface elevation at each pressure transducer. The elevation of the transducer at the dam intake was derived by subtracting the transducer's measured depth on 1/2/05 at 00:00 hrs from the gauge measured WSE at that time. The error in this approach could have been reduced by comparing multiple transducer & gauge measurements in time, and then using the mean resulting transducer elevation. This error reduction seemed unnecessary given the lack of datum-based elevation data at the other transducer locations. Data for the USGS gauge was also not readily available. The water surface elevation at the dam intake transducer was calculated by adding the transducer-measured depth to the transducer elevation. The water surface elevations of the Sandbar Village and Rock Creek locations were determined by calculating the average difference between each location's transducer-measured depths and the elevations at the dam intake. The local water surface elevations were then determined by adding the average depth difference to the heights measured by each transducer.

The water surface elevation at each gauge location is shown in Figure 2. While some variation of water surface was evident at short time scales, the elevation agreement at larger time scales indicates the lake is flat, with elevation changes equal for all sections of the lake. To investigate the short time-scale variations, the difference between elevations recorded at each gauge were calculated (Figure 3). Variations were generally less than one inch (0.083 feet) at all locations; however, larger differences (up to 6", or 0.5 feet) were evident during isolated periods. Small variations (< 1 inch) are to be expected due to the accuracy limits of the transducers. Larger variations may be due to temporal effects, such as boat-induced waves in the vicinity of a transducer.

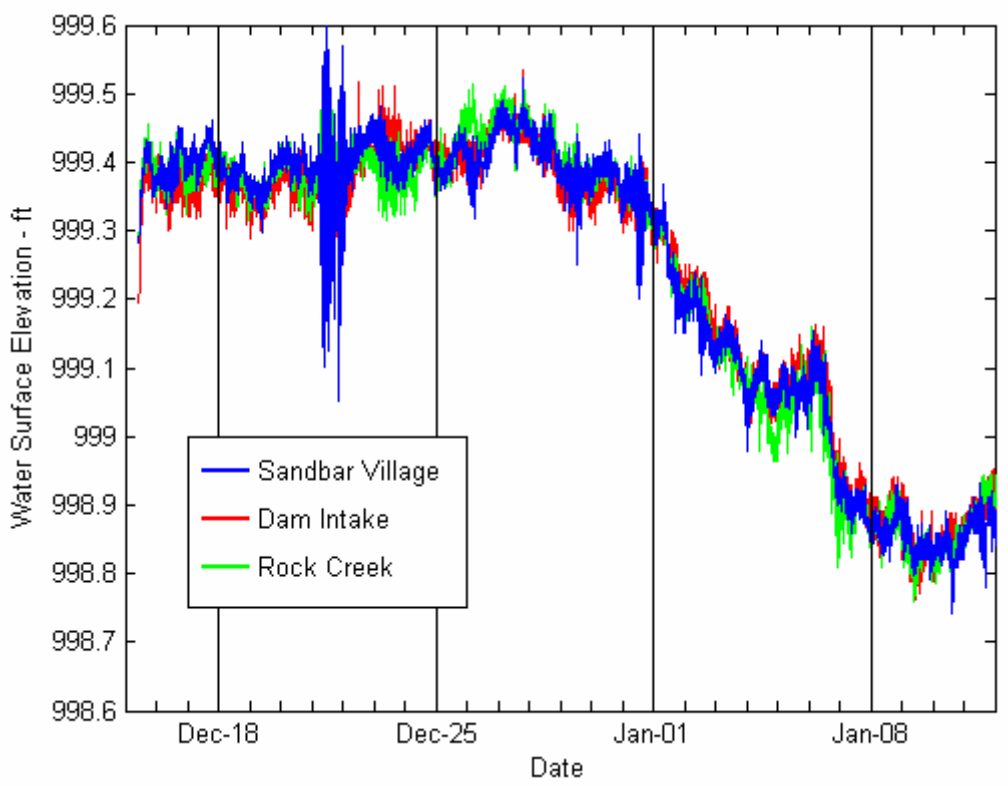


Figure 2 – Water surface elevation at each water level installation

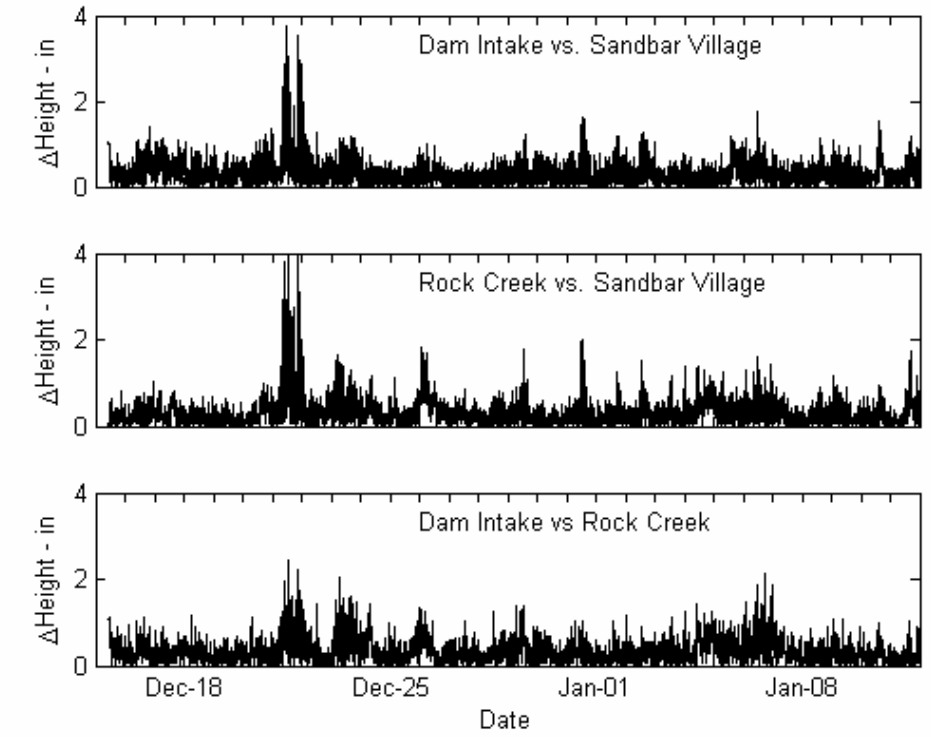


Figure 3 – Differences between water surface elevations at each TWDB installation

Appendix B

Possum Kingdom Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — DECEMBER 2004- JANUARY 2005 SURVEY

Conservation Pool Elevation 1000.0'

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
893					0	0	0	0	0	0
894	0	0	0	0	0	0	0	0	0	0
895	0	0	0	0	0	1	1	1	1	1
896	1	1	1	1	1	2	2	2	2	2
897	2	3	3	3	3	3	4	4	4	5
898	5	6	7	8	9	10	12	13	15	16
899	18	20	22	25	27	30	34	37	41	46
900	50	55	61	66	72	79	85	93	100	108
901	116	125	134	143	154	164	175	186	198	210
902	222	234	247	261	274	289	304	319	334	351
903	367	384	402	420	438	457	476	495	516	536
904	558	579	602	624	647	671	695	719	744	769
905	794	820	847	874	902	931	960	990	1,020	1,050
906	1,082	1,113	1,145	1,178	1,211	1,244	1,278	1,312	1,347	1,384
907	1,421	1,459	1,497	1,537	1,577	1,618	1,659	1,701	1,744	1,787
908	1,831	1,876	1,921	1,967	2,013	2,060	2,108	2,156	2,204	2,254
909	2,304	2,354	2,405	2,457	2,509	2,562	2,615	2,668	2,722	2,777
910	2,832	2,887	2,943	2,999	3,056	3,113	3,170	3,228	3,287	3,346
911	3,405	3,465	3,526	3,587	3,648	3,710	3,773	3,837	3,900	3,965
912	4,030	4,096	4,162	4,229	4,296	4,364	4,433	4,502	4,572	4,642
913	4,712	4,784	4,855	4,927	5,000	5,073	5,146	5,220	5,294	5,369
914	5,444	5,520	5,596	5,672	5,749	5,827	5,904	5,983	6,062	6,141
915	6,221	6,301	6,382	6,464	6,546	6,629	6,712	6,796	6,880	6,965
916	7,050	7,136	7,222	7,308	7,396	7,483	7,571	7,660	7,749	7,838
917	7,928	8,018	8,109	8,200	8,292	8,384	8,477	8,571	8,665	8,760
918	8,855	8,951	9,047	9,144	9,241	9,339	9,438	9,537	9,636	9,737
919	9,837	9,939	10,041	10,143	10,246	10,349	10,453	10,558	10,663	10,769
920	10,875	10,982	11,089	11,197	11,305	11,414	11,524	11,634	11,745	11,856
921	11,968	12,080	12,193	12,307	12,421	12,535	12,650	12,765	12,881	12,997
922	13,114	13,231	13,349	13,467	13,586	13,706	13,826	13,946	14,067	14,189
923	14,312	14,435	14,560	14,684	14,810	14,936	15,063	15,191	15,319	15,449
924	15,578	15,709	15,840	15,972	16,104	16,237	16,371	16,506	16,641	16,777
925	16,914	17,051	17,189	17,327	17,466	17,606	17,746	17,887	18,029	18,171
926	18,315	18,459	18,605	18,752	18,900	19,050	19,200	19,352	19,506	19,660
927	19,815	19,972	20,129	20,288	20,447	20,608	20,769	20,932	21,095	21,259
928	21,425	21,591	21,758	21,926	22,096	22,267	22,438	22,611	22,785	22,960
929	23,135	23,312	23,490	23,670	23,850	24,032	24,214	24,398	24,582	24,768
930	24,954	25,142	25,331	25,520	25,711	25,903	26,096	26,290	26,484	26,680
931	26,877	27,074	27,273	27,472	27,673	27,875	28,078	28,282	28,487	28,693
932	28,900	29,108	29,318	29,528	29,739	29,952	30,166	30,381	30,597	30,814
933	31,032	31,252	31,473	31,694	31,917	32,142	32,367	32,593	32,821	33,049
934	33,279	33,510	33,742	33,975	34,209	34,444	34,681	34,918	35,156	35,395
935	35,636	35,877	36,119	36,362	36,607	36,852	37,098	37,345	37,593	37,843
936	38,093	38,344	38,596	38,850	39,104	39,359	39,615	39,872	40,131	40,391
937	40,651	40,913	41,177	41,441	41,706	41,972	42,240	42,509	42,778	43,050
938	43,322	43,596	43,871	44,147	44,424	44,703	44,983	45,264	45,547	45,830
939	46,115	46,400	46,688	46,976	47,265	47,556	47,848	48,141	48,436	48,732
940	49,029	49,327	49,627	49,927	50,230	50,533	50,837	51,143	51,450	51,758
941	52,068	52,378	52,690	53,003	53,318	53,633	53,950	54,268	54,587	54,908
942	55,230	55,553	55,877	56,203	56,530	56,858	57,187	57,518	57,849	58,182
943	58,517	58,852	59,189	59,527	59,866	60,207	60,548	60,891	61,235	61,581
944	61,927	62,275	62,624	62,974	63,326	63,679	64,033	64,388	64,744	65,102
945	65,461	65,821	66,183	66,545	66,909	67,274	67,640	68,008	68,376	68,746
946	69,117	69,489	69,862	70,236	70,612	70,989	71,367	71,747	72,127	72,510
947	72,893	73,277	73,663	74,050	74,438	74,827	75,218	75,610	76,003	76,398
948	76,794	77,191	77,589	77,989	78,390	78,792	79,195	79,599	80,005	80,412
949	80,820	81,229	81,639	82,051	82,464	82,878	83,293	83,709	84,126	84,545

Appendix B (continued)

Possum Kingdom Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — DECEMBER 2004- JANUARY 2005 SURVEY

Conservation Pool Elevation 1000.0'

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
950	84,965	85,386	85,809	86,233	86,658	87,084	87,512	87,941	88,371	88,802
951	89,235	89,669	90,105	90,541	90,980	91,419	91,860	92,302	92,746	93,191
952	93,637	94,084	94,534	94,984	95,436	95,889	96,343	96,799	97,256	97,715
953	98,174	98,635	99,098	99,561	100,027	100,493	100,960	101,430	101,900	102,372
954	102,845	103,319	103,795	104,272	104,751	105,230	105,712	106,194	106,678	107,164
955	107,650	108,139	108,629	109,120	109,613	110,107	110,603	111,100	111,598	112,098
956	112,599	113,101	113,605	114,110	114,616	115,124	115,633	116,144	116,655	117,169
957	117,683	118,199	118,716	119,235	119,755	120,277	120,799	121,324	121,849	122,376
958	122,904	123,434	123,965	124,497	125,031	125,566	126,103	126,641	127,181	127,722
959	128,265	128,809	129,354	129,901	130,450	131,000	131,551	132,105	132,659	133,216
960	133,774	134,333	134,894	135,457	136,021	136,586	137,153	137,722	138,292	138,863
961	139,436	140,010	140,586	141,163	141,742	142,322	142,903	143,486	144,071	144,656
962	145,243	145,832	146,422	147,013	147,605	148,199	148,794	149,391	149,989	150,589
963	151,190	151,793	152,397	153,002	153,609	154,218	154,827	155,439	156,052	156,666
964	157,282	157,899	158,518	159,138	159,760	160,383	161,008	161,634	162,262	162,892
965	163,522	164,155	164,789	165,425	166,062	166,701	167,342	167,985	168,629	169,275
966	169,923	170,573	171,225	171,878	172,534	173,191	173,850	174,512	175,175	175,840
967	176,507	177,176	177,847	178,520	179,195	179,871	180,549	181,229	181,910	182,594
968	183,279	183,966	184,655	185,345	186,037	186,731	187,426	188,124	188,822	189,524
969	190,226	190,931	191,637	192,345	193,056	193,768	194,482	195,198	195,915	196,635
970	197,355	198,078	198,803	199,529	200,258	200,988	201,720	202,454	203,189	203,927
971	204,666	205,407	206,151	206,896	207,643	208,391	209,142	209,895	210,650	211,407
972	212,166	212,927	213,691	214,456	215,224	215,994	216,766	217,541	218,317	219,097
973	219,878	220,662	221,448	222,236	223,027	223,819	224,614	225,412	226,211	227,013
974	227,817	228,623	229,432	230,243	231,056	231,871	232,689	233,510	234,332	235,157
975	235,984	236,813	237,645	238,479	239,316	240,155	240,995	241,839	242,685	243,534
976	244,385	245,238	246,094	246,952	247,813	248,675	249,541	250,409	251,279	252,153
977	253,028	253,905	254,786	255,669	256,554	257,442	258,332	259,225	260,120	261,018
978	261,918	262,821	263,728	264,636	265,548	266,463	267,380	268,300	269,223	270,149
979	271,078	272,010	272,945	273,884	274,826	275,771	276,720	277,673	278,628	279,588
980	280,550	281,515	282,483	283,454	284,429	285,406	286,386	287,369	288,355	289,345
981	290,336	291,331	292,330	293,331	294,337	295,344	296,355	297,370	298,388	299,409
982	300,433	301,460	302,491	303,524	304,561	305,601	306,644	307,690	308,739	309,792
983	310,848	311,906	312,969	314,033	315,102	316,173	317,247	318,325	319,405	320,489
984	321,575	322,665	323,758	324,853	325,953	327,054	328,159	329,268	330,378	331,493
985	332,610	333,730	334,853	335,979	337,109	338,240	339,375	340,513	341,654	342,798
986	343,944	345,093	346,246	347,401	348,560	349,720	350,884	352,052	353,221	354,395
987	355,570	356,748	357,930	359,114	360,302	361,491	362,684	363,880	365,079	366,281
988	367,485	368,692	369,903	371,116	372,333	373,551	374,773	375,999	377,226	378,457
989	379,691	380,927	382,167	383,410	384,656	385,904	387,156	388,411	389,669	390,931
990	392,195	393,462	394,732	396,005	397,283	398,562	399,845	401,132	402,422	403,716
991	405,013	406,313	407,618	408,925	410,236	411,550	412,867	414,188	415,512	416,841
992	418,172	419,508	420,848	422,192	423,541	424,894	426,252	427,617	428,988	430,365
993	431,747	433,135	434,531	435,931	437,339	438,751	440,170	441,596	443,028	444,468
994	445,914	447,368	448,830	450,300	451,778	453,261	454,751	456,247	457,747	459,253
995	460,764	462,278	463,797	465,320	466,846	468,376	469,910	471,447	472,988	474,533
996	476,080	477,630	479,184	480,741	482,302	483,865	485,431	487,001	488,573	490,149
997	491,727	493,308	494,892	496,479	498,069	499,661	501,256	502,855	504,455	506,059
998	507,665	509,273	510,885	512,499	514,117	515,736	517,358	518,983	520,610	522,241
999	523,873	525,508	527,147	528,787	530,430	532,075	533,723	535,374	537,026	538,682
1000	540,340									

Appendix C

Possum Kingdom Lake

RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD — DECEMBER 2004- JANUARY 2005 SURVEY

Conservation Pool Elevation 1000.0'

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
893					0	0	0	0	0	0
894	0	0	0	0	0	0	0	0	0	0
895	0	0	1	1	1	1	1	1	1	1
896	1	1	1	1	1	1	1	2	2	2
897	2	2	2	2	3	3	3	3	4	5
898	6	8	9	10	12	13	14	15	16	18
899	19	21	23	25	28	32	36	39	42	45
900	48	51	55	59	62	65	69	72	76	80
901	84	88	94	99	104	108	111	114	117	120
902	123	127	131	137	142	146	150	154	159	164
903	168	173	177	181	185	189	194	199	204	210
904	216	221	225	229	233	237	240	244	248	252
905	257	263	270	277	283	289	295	300	305	309
906	314	318	322	327	331	336	342	348	356	366
907	375	384	392	399	405	412	418	424	430	436
908	443	449	455	461	466	472	477	483	490	497
909	502	508	513	518	523	528	533	538	543	548
910	552	556	560	565	569	573	577	582	587	591
911	597	602	608	613	619	625	631	636	642	648
912	654	660	666	671	677	683	689	694	699	704
913	709	714	718	722	727	731	735	740	745	750
914	755	759	763	768	772	776	781	786	791	796
915	802	808	813	819	824	829	835	840	845	850
916	855	860	864	869	874	879	883	888	892	896
917	900	905	909	915	920	927	933	939	945	950
918	955	960	966	971	976	982	987	993	999	1,006
919	1,011	1,016	1,022	1,027	1,032	1,038	1,043	1,048	1,054	1,059
920	1,064	1,070	1,075	1,081	1,087	1,093	1,099	1,105	1,111	1,116
921	1,121	1,126	1,131	1,136	1,141	1,146	1,151	1,156	1,161	1,166
922	1,171	1,175	1,180	1,185	1,191	1,196	1,202	1,209	1,216	1,223
923	1,231	1,238	1,245	1,252	1,260	1,267	1,274	1,281	1,287	1,294
924	1,301	1,308	1,314	1,321	1,328	1,335	1,342	1,349	1,356	1,363
925	1,369	1,375	1,381	1,387	1,393	1,399	1,406	1,414	1,422	1,431
926	1,441	1,453	1,464	1,475	1,488	1,500	1,514	1,526	1,537	1,548
927	1,559	1,570	1,580	1,591	1,600	1,610	1,619	1,628	1,638	1,648
928	1,657	1,668	1,678	1,690	1,701	1,712	1,722	1,733	1,743	1,753
929	1,763	1,775	1,787	1,798	1,809	1,820	1,830	1,841	1,851	1,861
930	1,872	1,882	1,892	1,903	1,913	1,923	1,933	1,942	1,952	1,962
931	1,971	1,981	1,991	2,002	2,012	2,023	2,034	2,045	2,056	2,066
932	2,077	2,088	2,099	2,109	2,121	2,132	2,143	2,155	2,166	2,178
933	2,189	2,201	2,213	2,225	2,236	2,247	2,258	2,270	2,281	2,292
934	2,304	2,315	2,325	2,336	2,346	2,357	2,367	2,377	2,387	2,397
935	2,408	2,418	2,427	2,437	2,447	2,457	2,468	2,478	2,488	2,497
936	2,507	2,517	2,527	2,536	2,546	2,557	2,568	2,579	2,591	2,603
937	2,614	2,625	2,636	2,647	2,658	2,669	2,681	2,693	2,705	2,718
938	2,730	2,743	2,756	2,769	2,781	2,794	2,806	2,818	2,829	2,841
939	2,853	2,864	2,877	2,889	2,901	2,914	2,926	2,939	2,952	2,965
940	2,977	2,990	3,002	3,014	3,027	3,039	3,051	3,063	3,075	3,088
941	3,100	3,112	3,125	3,137	3,150	3,162	3,174	3,187	3,200	3,212
942	3,225	3,237	3,250	3,262	3,274	3,287	3,299	3,311	3,324	3,337
943	3,349	3,362	3,374	3,386	3,398	3,411	3,423	3,436	3,448	3,460
944	3,472	3,484	3,496	3,509	3,521	3,534	3,546	3,559	3,571	3,583
945	3,595	3,608	3,620	3,632	3,644	3,656	3,668	3,679	3,691	3,703
946	3,715	3,726	3,739	3,751	3,764	3,776	3,788	3,801	3,813	3,826
947	3,838	3,851	3,863	3,876	3,888	3,901	3,914	3,926	3,939	3,952
948	3,964	3,977	3,990	4,002	4,014	4,026	4,038	4,050	4,062	4,074
949	4,086	4,098	4,110	4,122	4,133	4,145	4,157	4,169	4,181	4,193

Appendix C (continued)

Possum Kingdom Lake

RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD — DECEMBER 2004- JANUARY 2005 SURVEY

Conservation Pool Elevation 1000.0'

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
950	4,206	4,219	4,232	4,245	4,257	4,270	4,282	4,295	4,308	4,321
951	4,334	4,348	4,362	4,375	4,389	4,402	4,415	4,429	4,442	4,455
952	4,469	4,483	4,497	4,511	4,524	4,538	4,551	4,565	4,578	4,591
953	4,604	4,617	4,631	4,644	4,657	4,670	4,684	4,697	4,710	4,724
954	4,737	4,751	4,764	4,778	4,792	4,806	4,819	4,832	4,846	4,861
955	4,877	4,892	4,907	4,921	4,935	4,949	4,963	4,977	4,990	5,004
956	5,017	5,030	5,044	5,057	5,070	5,084	5,097	5,111	5,125	5,139
957	5,153	5,167	5,180	5,194	5,208	5,221	5,235	5,248	5,262	5,276
958	5,290	5,304	5,317	5,331	5,345	5,360	5,375	5,389	5,404	5,418
959	5,433	5,448	5,462	5,477	5,493	5,508	5,524	5,540	5,556	5,571
960	5,587	5,602	5,618	5,633	5,648	5,663	5,678	5,693	5,707	5,722
961	5,736	5,750	5,765	5,779	5,793	5,807	5,821	5,835	5,849	5,863
962	5,877	5,891	5,905	5,919	5,933	5,947	5,961	5,975	5,990	6,004
963	6,018	6,033	6,047	6,062	6,077	6,091	6,106	6,121	6,136	6,151
964	6,166	6,180	6,195	6,210	6,225	6,240	6,255	6,271	6,286	6,302
965	6,317	6,333	6,349	6,365	6,382	6,400	6,417	6,435	6,453	6,471
966	6,489	6,507	6,526	6,544	6,564	6,583	6,603	6,624	6,643	6,662
967	6,681	6,701	6,719	6,737	6,755	6,772	6,790	6,807	6,824	6,842
968	6,860	6,877	6,895	6,912	6,929	6,947	6,964	6,982	7,000	7,019
969	7,037	7,055	7,073	7,092	7,111	7,130	7,148	7,166	7,184	7,202
970	7,220	7,238	7,256	7,274	7,292	7,311	7,329	7,348	7,366	7,385
971	7,403	7,421	7,440	7,459	7,479	7,499	7,519	7,539	7,560	7,580
972	7,601	7,622	7,643	7,666	7,688	7,711	7,734	7,757	7,780	7,804
973	7,827	7,849	7,871	7,894	7,916	7,938	7,960	7,984	8,007	8,029
974	8,052	8,075	8,098	8,120	8,143	8,167	8,190	8,213	8,237	8,260
975	8,283	8,306	8,329	8,352	8,376	8,400	8,423	8,448	8,473	8,497
976	8,521	8,546	8,570	8,594	8,618	8,642	8,667	8,692	8,717	8,742
977	8,767	8,791	8,816	8,840	8,865	8,889	8,914	8,939	8,965	8,992
978	9,019	9,046	9,075	9,103	9,131	9,159	9,187	9,216	9,245	9,274
979	9,305	9,336	9,369	9,403	9,437	9,471	9,507	9,542	9,575	9,607
980	9,637	9,668	9,698	9,728	9,757	9,786	9,816	9,846	9,876	9,906
981	9,937	9,968	9,999	10,031	10,064	10,096	10,129	10,162	10,194	10,226
982	10,257	10,289	10,320	10,351	10,383	10,414	10,446	10,478	10,510	10,541
983	10,573	10,603	10,634	10,665	10,696	10,728	10,759	10,790	10,821	10,851
984	10,882	10,912	10,943	10,974	11,004	11,035	11,066	11,096	11,126	11,156
985	11,187	11,216	11,246	11,276	11,306	11,335	11,364	11,393	11,421	11,450
986	11,480	11,509	11,538	11,567	11,597	11,626	11,656	11,685	11,714	11,743
987	11,772	11,800	11,828	11,857	11,886	11,914	11,943	11,973	12,002	12,031
988	12,060	12,089	12,118	12,147	12,176	12,205	12,235	12,264	12,294	12,323
989	12,352	12,381	12,411	12,442	12,473	12,504	12,535	12,565	12,596	12,626
990	12,657	12,688	12,719	12,750	12,783	12,816	12,849	12,884	12,918	12,954
991	12,989	13,023	13,057	13,091	13,124	13,158	13,191	13,226	13,263	13,300
992	13,337	13,376	13,418	13,462	13,509	13,562	13,616	13,675	13,735	13,796
993	13,858	13,918	13,978	14,037	14,098	14,160	14,224	14,290	14,359	14,429
994	14,500	14,578	14,661	14,738	14,806	14,871	14,928	14,981	15,033	15,082
995	15,126	15,168	15,207	15,246	15,283	15,319	15,355	15,390	15,424	15,458
996	15,491	15,523	15,555	15,587	15,618	15,649	15,679	15,709	15,739	15,768
997	15,798	15,826	15,855	15,883	15,911	15,939	15,966	15,994	16,021	16,049
998	16,076	16,103	16,129	16,156	16,183	16,209	16,235	16,262	16,288	16,314
999	16,340	16,365	16,391	16,416	16,442	16,467	16,492	16,517	16,542	16,567
1,000	16,716									

Appendix D

Possum Kingdom Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 1994 SURVEY(revised 2005)

Conservation Pool Elevation 1000.0'

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
893					0	0	0	0	0	0
894	0	0	0	0	0	0	0	0	0	0
895	0	0	0	0	0	0	0	0	0	1
896	1	1	1	1	1	2	2	2	3	4
897	4	5	6	8	9	11	13	15	17	20
898	23	26	30	33	38	42	47	52	57	63
899	69	75	82	89	97	105	113	122	132	142
900	153	164	176	188	200	213	225	239	252	266
901	280	295	310	325	340	356	372	388	405	422
902	439	457	475	493	511	530	550	569	590	610
903	632	653	675	698	721	744	768	793	818	844
904	870	896	923	951	978	1,007	1,035	1,064	1,093	1,123
905	1,153	1,184	1,215	1,246	1,278	1,311	1,344	1,379	1,414	1,450
906	1,487	1,524	1,561	1,599	1,638	1,677	1,716	1,757	1,798	1,839
907	1,881	1,923	1,966	2,010	2,054	2,099	2,144	2,191	2,237	2,284
908	2,332	2,381	2,430	2,480	2,531	2,582	2,634	2,687	2,740	2,794
909	2,848	2,903	2,959	3,015	3,072	3,130	3,188	3,247	3,306	3,366
910	3,426	3,487	3,549	3,611	3,674	3,737	3,801	3,866	3,931	3,997
911	4,063	4,130	4,197	4,266	4,334	4,403	4,473	4,544	4,615	4,686
912	4,758	4,831	4,904	4,978	5,052	5,126	5,201	5,277	5,353	5,430
913	5,507	5,585	5,663	5,742	5,821	5,901	5,981	6,062	6,143	6,226
914	6,308	6,391	6,475	6,559	6,644	6,729	6,815	6,901	6,988	7,076
915	7,163	7,252	7,341	7,430	7,519	7,609	7,700	7,791	7,882	7,974
916	8,066	8,159	8,253	8,347	8,442	8,538	8,634	8,730	8,828	8,926
917	9,025	9,124	9,224	9,325	9,426	9,528	9,631	9,734	9,839	9,943
918	10,048	10,154	10,260	10,367	10,475	10,583	10,691	10,801	10,910	11,021
919	11,131	11,243	11,355	11,467	11,580	11,694	11,808	11,923	12,038	12,154
920	12,270	12,387	12,504	12,622	12,741	12,860	12,979	13,100	13,220	13,341
921	13,463	13,585	13,708	13,831	13,954	14,079	14,203	14,329	14,455	14,581
922	14,708	14,836	14,964	15,092	15,221	15,351	15,481	15,612	15,743	15,875
923	16,007	16,140	16,274	16,408	16,543	16,678	16,813	16,950	17,087	17,224
924	17,362	17,500	17,640	17,780	17,920	18,061	18,203	18,346	18,490	18,634
925	18,779	18,925	19,072	19,220	19,370	19,522	19,675	19,830	19,987	20,145
926	20,304	20,465	20,626	20,789	20,954	21,119	21,285	21,453	21,621	21,791
927	21,961	22,133	22,305	22,479	22,654	22,829	23,006	23,184	23,363	23,543
928	23,725	23,907	24,091	24,275	24,461	24,647	24,835	25,024	25,213	25,404
929	25,595	25,788	25,982	26,176	26,372	26,568	26,766	26,965	27,164	27,365
930	27,566	27,768	27,971	28,176	28,381	28,586	28,793	29,001	29,210	29,420
931	29,631	29,843	30,056	30,270	30,485	30,700	30,917	31,134	31,353	31,572
932	31,792	32,013	32,236	32,459	32,684	32,909	33,136	33,363	33,592	33,821
933	34,052	34,283	34,516	34,749	34,984	35,219	35,455	35,692	35,931	36,170
934	36,410	36,651	36,894	37,136	37,380	37,625	37,871	38,118	38,365	38,614
935	38,864	39,114	39,366	39,619	39,873	40,128	40,384	40,641	40,898	41,157
936	41,417	41,678	41,940	42,203	42,467	42,732	42,998	43,265	43,533	43,802
937	44,073	44,344	44,616	44,890	45,164	45,440	45,717	45,996	46,275	46,556
938	46,838	47,121	47,406	47,692	47,979	48,267	48,556	48,847	49,139	49,433
939	49,727	50,023	50,320	50,618	50,918	51,219	51,521	51,824	52,129	52,435
940	52,742	53,050	53,360	53,671	53,983	54,296	54,611	54,926	55,243	55,561
941	55,880	56,200	56,522	56,844	57,168	57,493	57,819	58,147	58,476	58,806
942	59,137	59,469	59,802	60,137	60,472	60,809	61,147	61,486	61,826	62,168
943	62,511	62,854	63,199	63,545	63,893	64,241	64,590	64,941	65,292	65,645
944	65,999	66,354	66,710	67,067	67,426	67,785	68,146	68,508	68,871	69,235
945	69,600	69,967	70,335	70,703	71,073	71,445	71,817	72,191	72,566	72,942
946	73,320	73,698	74,079	74,460	74,843	75,227	75,612	75,999	76,387	76,776
947	77,167	77,558	77,951	78,345	78,741	79,137	79,535	79,934	80,334	80,735
948	81,138	81,542	81,947	82,353	82,761	83,169	83,579	83,990	84,402	84,816
949	85,231	85,647	86,064	86,482	86,902	87,323	87,745	88,169	88,594	89,020

Appendix D (continued)

Possum Kingdom Lake

RESERVOIR VOLUME TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 1994 SURVEY(revised 2005)

Conservation Pool Elevation 1000.0'

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
950	89,447	89,875	90,305	90,736	91,168	91,602	92,036	92,473	92,910	93,349
951	93,789	94,230	94,673	95,118	95,563	96,010	96,459	96,908	97,359	97,812
952	98,265	98,720	99,176	99,634	100,093	100,553	101,014	101,477	101,941	102,406
953	102,873	103,341	103,811	104,282	104,754	105,228	105,703	106,180	106,658	107,137
954	107,618	108,099	108,583	109,067	109,553	110,040	110,528	111,018	111,508	112,001
955	112,494	112,989	113,486	113,983	114,483	114,983	115,485	115,988	116,493	116,999
956	117,506	118,014	118,524	119,035	119,548	120,062	120,577	121,094	121,611	122,131
957	122,652	123,173	123,697	124,222	124,748	125,275	125,804	126,334	126,866	127,399
958	127,933	128,469	129,007	129,546	130,087	130,629	131,172	131,717	132,263	132,811
959	133,361	133,911	134,464	135,017	135,572	136,129	136,687	137,246	137,807	138,370
960	138,933	139,498	140,065	140,633	141,203	141,773	142,345	142,919	143,494	144,070
961	144,648	145,227	145,807	146,389	146,973	147,557	148,143	148,731	149,320	149,911
962	150,503	151,097	151,693	152,290	152,889	153,489	154,091	154,695	155,300	155,907
963	156,516	157,126	157,738	158,351	158,966	159,582	160,201	160,821	161,442	162,065
964	162,689	163,315	163,943	164,572	165,203	165,836	166,470	167,106	167,743	168,382
965	169,022	169,664	170,308	170,954	171,601	172,250	172,901	173,553	174,207	174,863
966	175,520	176,179	176,840	177,502	178,167	178,833	179,500	180,170	180,841	181,514
967	182,189	182,866	183,545	184,225	184,908	185,592	186,278	186,966	187,656	188,347
968	189,040	189,735	190,432	191,130	191,831	192,532	193,236	193,941	194,648	195,357
969	196,067	196,779	197,493	198,209	198,926	199,645	200,366	201,089	201,813	202,540
970	203,267	203,997	204,729	205,462	206,198	206,936	207,675	208,417	209,160	209,905
971	210,652	211,401	212,152	212,905	213,661	214,418	215,177	215,939	216,702	217,468
972	218,236	219,005	219,778	220,551	221,328	222,106	222,886	223,669	224,454	225,241
973	226,029	226,820	227,614	228,409	229,207	230,007	230,809	231,614	232,420	233,229
974	234,040	234,853	235,669	236,487	237,308	238,131	238,955	239,783	240,612	241,445
975	242,279	243,115	243,954	244,795	245,639	246,485	247,333	248,184	249,036	249,891
976	250,749	251,608	252,471	253,335	254,203	255,072	255,944	256,820	257,697	258,578
977	259,460	260,346	261,234	262,125	263,018	263,914	264,812	265,713	266,616	267,523
978	268,431	269,342	270,256	271,173	272,092	273,014	273,939	274,866	275,797	276,730
979	277,666	278,604	279,547	280,491	281,439	282,391	283,345	284,304	285,265	286,230
980	287,197	288,168	289,142	290,118	291,099	292,081	293,067	294,056	295,048	296,043
981	297,041	298,042	299,047	300,054	301,065	302,078	303,095	304,115	305,139	306,166
982	307,195	308,228	309,264	310,303	311,346	312,391	313,439	314,491	315,545	316,604
983	317,664	318,728	319,796	320,866	321,940	323,016	324,095	325,178	326,264	327,353
984	328,444	329,539	330,637	331,738	332,843	333,950	335,060	336,174	337,291	338,411
985	339,533	340,659	341,788	342,919	344,054	345,191	346,331	347,474	348,620	349,769
986	350,920	352,074	353,231	354,391	355,554	356,719	357,887	359,058	360,232	361,409
987	362,588	363,771	364,956	366,144	367,336	368,530	369,727	370,927	372,130	373,337
988	374,546	375,758	376,975	378,193	379,416	380,642	381,870	383,104	384,340	385,580
989	386,823	388,069	389,320	390,574	391,831	393,092	394,357	395,626	396,897	398,174
990	399,453	400,736	402,023	403,314	404,608	405,906	407,208	408,515	409,825	411,140
991	412,459	413,782	415,111	416,443	417,781	419,123	420,471	421,825	423,183	424,548
992	425,918	427,292	428,672	430,056	431,446	432,841	434,241	435,646	437,057	438,473
993	439,894	441,320	442,751	444,186	445,626	447,070	448,519	449,973	451,431	452,894
994	454,360	455,831	457,307	458,786	460,270	461,757	463,248	464,744	466,242	467,746
995	469,251	470,761	472,275	473,791	475,313	476,836	478,364	479,895	481,429	482,967
996	484,507	486,050	487,597	489,146	490,698	492,252	493,808	495,368	496,930	498,495
997	500,062	501,631	503,203	504,777	506,355	507,934	509,515	511,100	512,687	514,277
998	515,869	517,462	519,060	520,659	522,261	523,865	525,471	527,081	528,692	530,306
999	531,922	533,540	535,162	536,785	538,412	540,040	541,670	543,304	544,939	546,577
1000	548,217									

Appendix E

Possum Kingdom Lake

RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 1994 SURVEY(revised 2005)

Conservation Pool Elevation 1000.0'

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
893					0	0	0	0	0	0
894	0	0	0	0	0	0	0	0	0	0
895	0	0	0	0	0	1	1	1	1	1
896	1	1	2	2	2	3	4	5	6	8
897	9	10	12	14	17	18	20	22	25	27
898	30	33	37	40	43	46	49	53	56	59
899	61	65	69	74	78	82	87	94	100	105
900	109	114	118	122	125	128	131	134	137	141
901	144	147	150	153	155	158	162	165	169	171
902	174	177	180	184	188	191	196	200	205	209
903	214	218	223	228	232	237	243	249	254	259
904	263	268	272	276	280	284	288	291	295	299
905	303	307	312	317	323	331	340	349	356	362
906	368	373	378	383	388	394	399	405	411	417
907	422	428	434	439	445	451	458	464	469	475
908	481	489	497	504	511	517	523	529	535	541
909	547	553	560	567	573	579	585	591	596	601
910	607	614	619	625	631	636	642	648	653	660
911	667	673	678	684	689	695	702	707	713	719
912	724	729	733	738	743	749	754	759	764	769
913	774	779	784	789	795	801	807	813	818	824
914	829	834	840	845	850	855	861	866	871	876
915	881	886	890	894	898	902	906	911	916	922
916	927	934	940	946	952	958	965	971	977	983
917	989	997	1,005	1,011	1,018	1,024	1,031	1,038	1,044	1,049
918	1,054	1,060	1,065	1,072	1,078	1,084	1,089	1,094	1,099	1,105
919	1,110	1,117	1,123	1,128	1,133	1,139	1,144	1,149	1,155	1,160
920	1,166	1,171	1,177	1,182	1,188	1,193	1,199	1,204	1,209	1,214
921	1,218	1,223	1,229	1,234	1,240	1,245	1,250	1,256	1,261	1,267
922	1,273	1,278	1,283	1,288	1,293	1,299	1,304	1,310	1,315	1,321
923	1,327	1,332	1,338	1,344	1,349	1,355	1,360	1,366	1,371	1,377
924	1,382	1,389	1,396	1,403	1,409	1,416	1,423	1,431	1,438	1,446
925	1,455	1,465	1,477	1,492	1,508	1,526	1,543	1,558	1,572	1,586
926	1,600	1,612	1,624	1,636	1,648	1,658	1,669	1,679	1,690	1,700
927	1,711	1,721	1,731	1,742	1,752	1,762	1,773	1,785	1,796	1,808
928	1,819	1,830	1,841	1,851	1,861	1,872	1,882	1,891	1,901	1,910
929	1,920	1,930	1,941	1,952	1,962	1,971	1,981	1,991	2,000	2,009
930	2,018	2,027	2,036	2,045	2,055	2,065	2,074	2,084	2,094	2,105
931	2,115	2,124	2,133	2,143	2,152	2,161	2,170	2,179	2,188	2,197
932	2,207	2,218	2,229	2,240	2,250	2,261	2,271	2,280	2,291	2,301
933	2,311	2,320	2,329	2,338	2,348	2,357	2,367	2,378	2,388	2,398
934	2,407	2,416	2,426	2,435	2,444	2,453	2,462	2,472	2,481	2,492
935	2,502	2,514	2,524	2,534	2,544	2,553	2,563	2,574	2,584	2,594
936	2,604	2,614	2,624	2,635	2,645	2,655	2,666	2,676	2,686	2,697
937	2,707	2,718	2,729	2,740	2,752	2,765	2,777	2,790	2,802	2,814
938	2,827	2,839	2,852	2,864	2,876	2,889	2,901	2,914	2,927	2,940
939	2,952	2,965	2,977	2,990	3,002	3,015	3,027	3,040	3,053	3,065
940	3,078	3,090	3,103	3,115	3,127	3,139	3,150	3,162	3,174	3,185
941	3,196	3,208	3,220	3,231	3,244	3,257	3,270	3,282	3,293	3,304
942	3,316	3,328	3,339	3,351	3,362	3,373	3,386	3,398	3,409	3,421
943	3,432	3,444	3,455	3,466	3,477	3,489	3,500	3,511	3,522	3,533
944	3,544	3,555	3,566	3,578	3,590	3,601	3,613	3,625	3,637	3,648
945	3,660	3,671	3,682	3,694	3,706	3,718	3,731	3,744	3,757	3,769
946	3,782	3,795	3,808	3,821	3,834	3,847	3,860	3,873	3,886	3,899
947	3,911	3,923	3,935	3,947	3,959	3,971	3,983	3,995	4,008	4,020
948	4,033	4,045	4,057	4,069	4,081	4,093	4,104	4,117	4,129	4,142
949	4,154	4,167	4,179	4,191	4,204	4,216	4,228	4,241	4,253	4,266

Appendix E (continued)

Possum Kingdom Lake

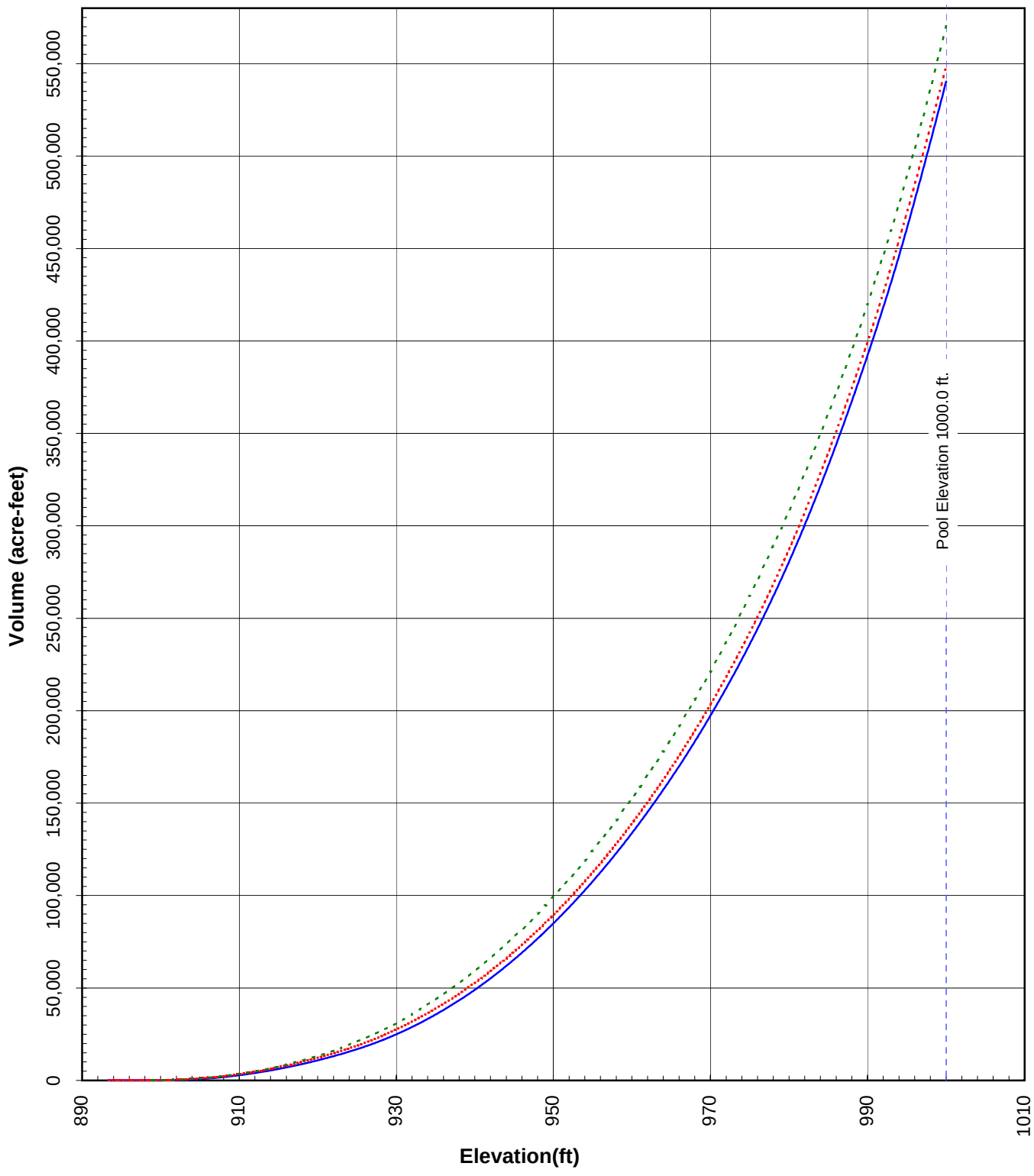
RESERVOIR AREA TABLE

TEXAS WATER DEVELOPMENT BOARD — JUNE 1994 SURVEY(revised 2005)

Conservation Pool Elevation 1000.0'

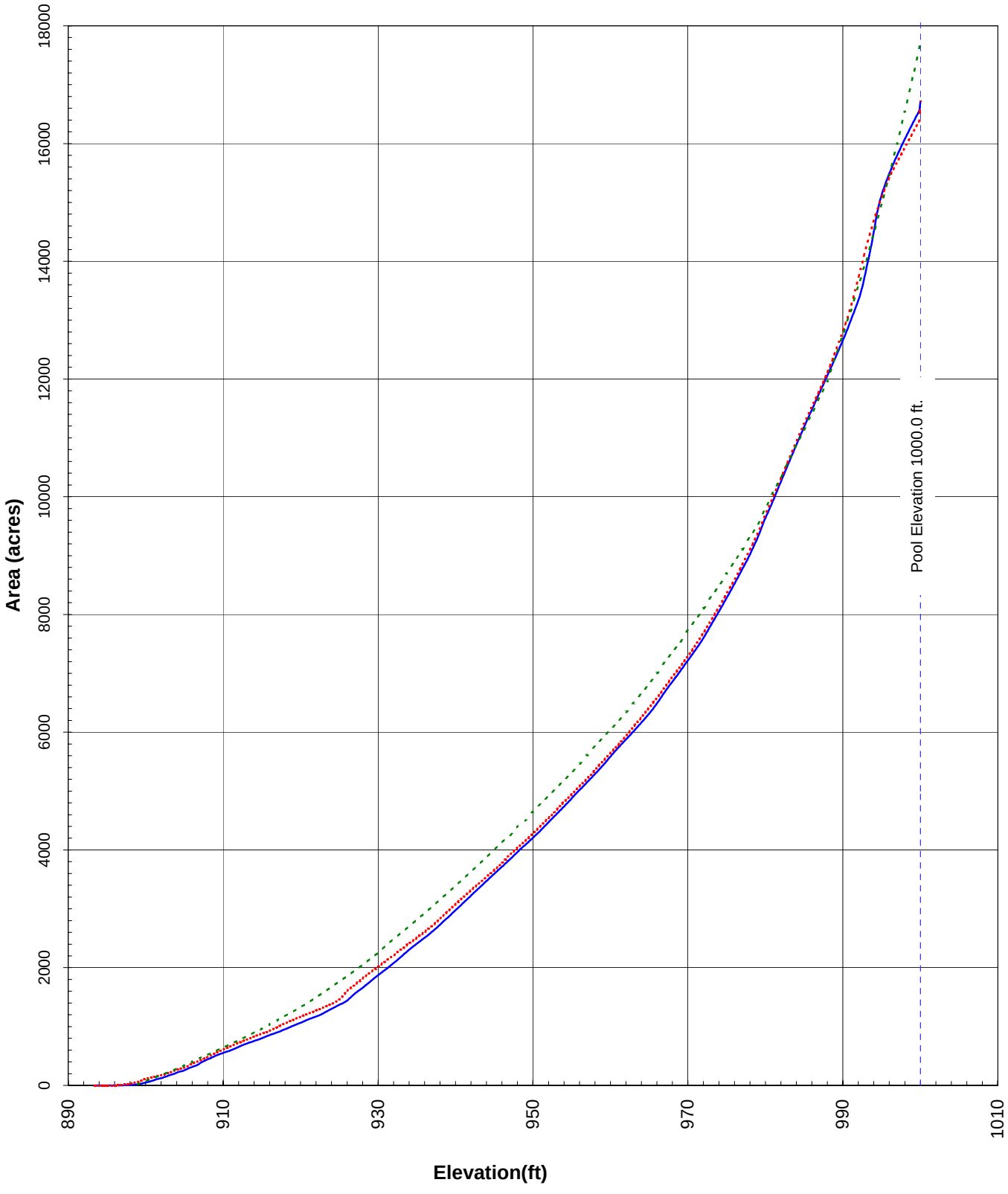
AREA IN ACRES — ELEVATION INCREMENT IS ONE TENTH FOOT

ELEVATION in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
950	4,278	4,291	4,304	4,316	4,329	4,341	4,354	4,368	4,381	4,395
951	4,409	4,422	4,436	4,450	4,463	4,477	4,490	4,503	4,517	4,530
952	4,543	4,556	4,569	4,582	4,595	4,608	4,621	4,634	4,647	4,660
953	4,674	4,688	4,703	4,718	4,732	4,745	4,759	4,772	4,786	4,799
954	4,812	4,825	4,838	4,851	4,863	4,876	4,889	4,902	4,916	4,929
955	4,943	4,956	4,970	4,984	4,999	5,013	5,026	5,039	5,052	5,065
956	5,078	5,092	5,105	5,119	5,132	5,145	5,159	5,173	5,186	5,200
957	5,214	5,227	5,241	5,254	5,268	5,282	5,295	5,309	5,323	5,337
958	5,352	5,367	5,383	5,399	5,413	5,428	5,443	5,457	5,472	5,486
959	5,500	5,515	5,529	5,544	5,558	5,573	5,587	5,602	5,616	5,631
960	5,645	5,659	5,673	5,687	5,701	5,715	5,728	5,742	5,756	5,770
961	5,784	5,798	5,811	5,825	5,839	5,853	5,868	5,884	5,900	5,915
962	5,931	5,947	5,964	5,980	5,997	6,013	6,029	6,045	6,061	6,077
963	6,093	6,110	6,126	6,142	6,158	6,174	6,190	6,206	6,221	6,237
964	6,253	6,269	6,285	6,301	6,317	6,333	6,349	6,365	6,381	6,396
965	6,413	6,430	6,447	6,465	6,481	6,499	6,515	6,532	6,548	6,565
966	6,582	6,599	6,616	6,634	6,651	6,669	6,686	6,704	6,722	6,740
967	6,758	6,777	6,796	6,815	6,834	6,852	6,871	6,889	6,906	6,924
968	6,941	6,958	6,975	6,992	7,010	7,027	7,044	7,061	7,078	7,095
969	7,113	7,130	7,148	7,165	7,183	7,200	7,217	7,235	7,253	7,271
970	7,289	7,308	7,327	7,346	7,365	7,385	7,405	7,424	7,443	7,462
971	7,481	7,500	7,521	7,541	7,561	7,582	7,604	7,625	7,646	7,668
972	7,689	7,710	7,731	7,752	7,773	7,795	7,816	7,836	7,857	7,877
973	7,899	7,921	7,944	7,967	7,989	8,011	8,033	8,055	8,077	8,100
974	8,122	8,145	8,169	8,192	8,215	8,239	8,262	8,285	8,308	8,331
975	8,355	8,378	8,400	8,423	8,447	8,471	8,493	8,516	8,538	8,562
976	8,586	8,610	8,634	8,659	8,684	8,710	8,737	8,764	8,790	8,816
977	8,842	8,868	8,894	8,919	8,945	8,970	8,996	9,022	9,048	9,074
978	9,100	9,126	9,153	9,179	9,206	9,233	9,261	9,289	9,317	9,346
979	9,374	9,403	9,433	9,463	9,495	9,531	9,565	9,597	9,630	9,661
980	9,693	9,723	9,753	9,783	9,813	9,844	9,874	9,904	9,935	9,965
981	9,996	10,027	10,057	10,089	10,122	10,154	10,186	10,218	10,250	10,282
982	10,314	10,345	10,376	10,406	10,438	10,470	10,501	10,532	10,563	10,594
983	10,626	10,657	10,688	10,719	10,750	10,780	10,811	10,841	10,872	10,902
984	10,933	10,964	10,996	11,028	11,059	11,090	11,121	11,151	11,182	11,212
985	11,242	11,271	11,301	11,330	11,358	11,387	11,416	11,444	11,473	11,501
986	11,528	11,556	11,584	11,612	11,640	11,668	11,696	11,724	11,753	11,782
987	11,811	11,840	11,869	11,897	11,927	11,957	11,987	12,017	12,048	12,078
988	12,110	12,141	12,173	12,207	12,241	12,275	12,310	12,346	12,380	12,415
989	12,450	12,485	12,521	12,557	12,593	12,629	12,666	12,703	12,740	12,777
990	12,815	12,851	12,888	12,924	12,962	13,001	13,041	13,082	13,125	13,169
991	13,213	13,259	13,305	13,351	13,400	13,453	13,507	13,561	13,618	13,671
992	13,720	13,771	13,821	13,871	13,922	13,974	14,028	14,080	14,134	14,185
993	14,235	14,283	14,330	14,377	14,423	14,468	14,513	14,558	14,602	14,646
994	14,689	14,733	14,774	14,814	14,855	14,895	14,934	14,971	15,008	15,044
995	15,080	15,116	15,152	15,188	15,224	15,259	15,293	15,326	15,358	15,389
996	15,420	15,450	15,479	15,505	15,530	15,556	15,581	15,606	15,632	15,657
997	15,682	15,707	15,732	15,757	15,782	15,807	15,832	15,857	15,882	15,906
998	15,931	15,956	15,980	16,005	16,029	16,054	16,078	16,103	16,127	16,151
999	16,175	16,199	16,223	16,248	16,272	16,295	16,319	16,343	16,367	16,391
1,000	16,716									



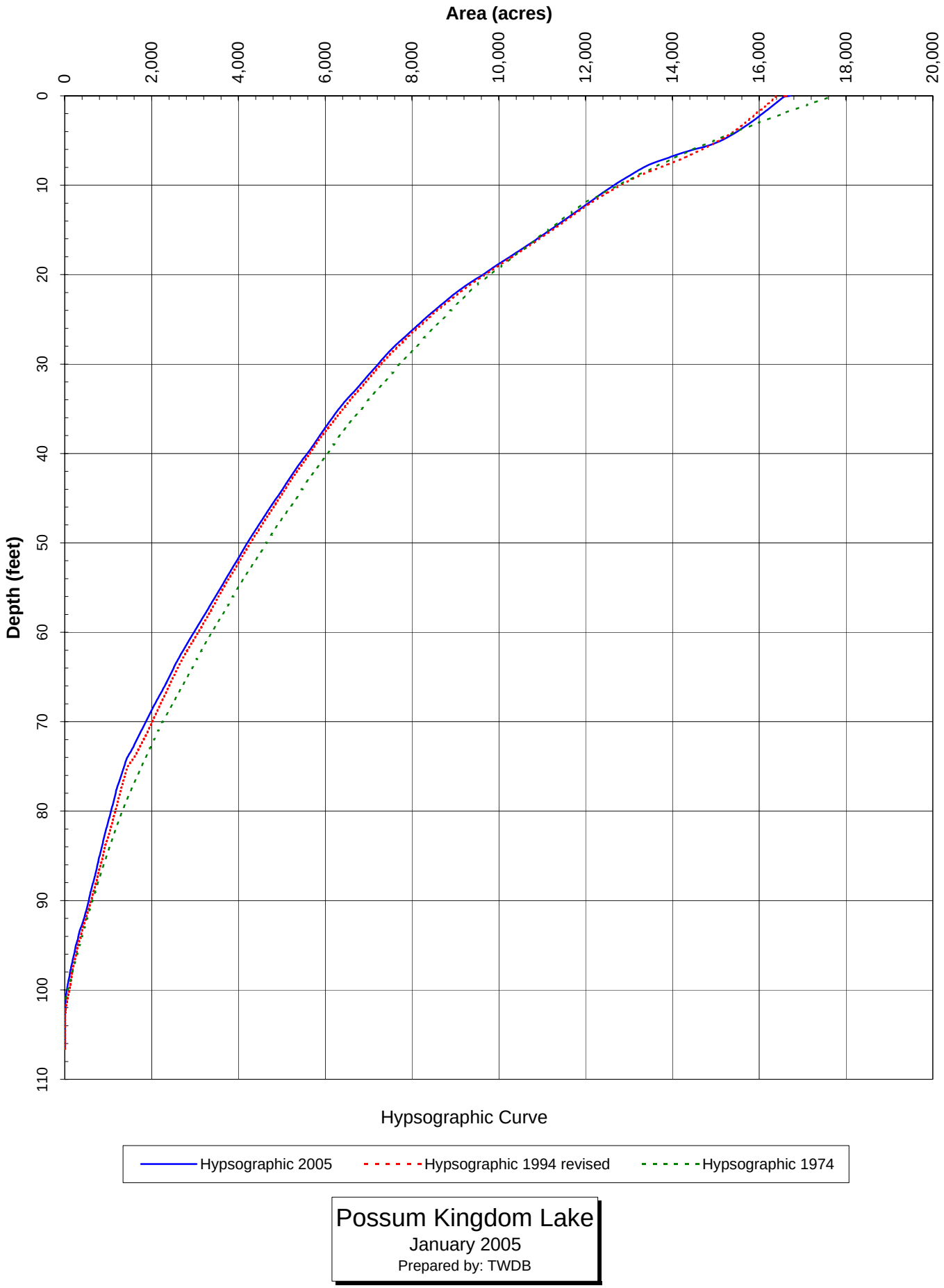
Possum Kingdom Lake
January 2005
Prepared by: TWDB

Appendix F Elevation vs. Volume



Possum Kingdom Lake
January 2005
Prepared by: TWDB

Appendix G Elevation vs. Area

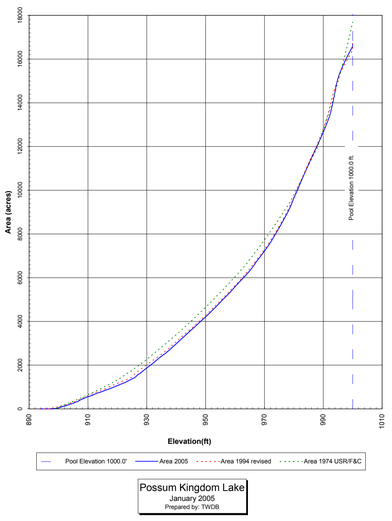


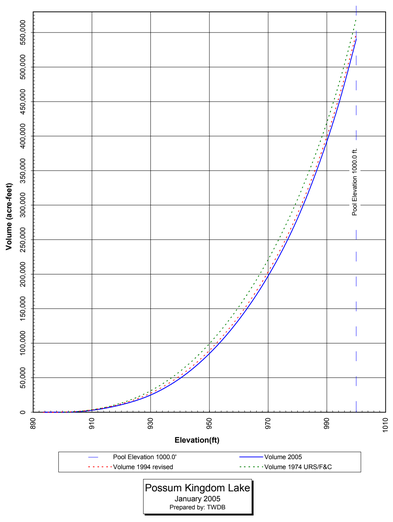
Appendix H Area vs Depth

Figure 6

Possum Kingdom Lake

10' - Contour Map





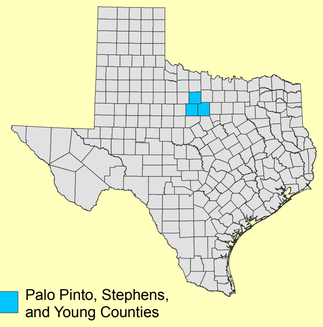
CONTOURS

900
910
920
930
940
950
960
970
980
990
1000

Islands

Lake Boundary at Conservation Pool Elevation 1000'

Projection: NAD83 State Plane Texas North Central Zone



Palo Pinto, Stephens, and Young 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 Possum Kingdom Lake. The Texas Water Development Board makes no representation or assumes any liability.

TEXAS WATER DEVELOPMENT BOARD DECEMBER 2004- JANUARY 2005 SURVEY

1,960,000 1,980,000 2,000,000

7,040,000 7,020,000 7,000,000 6,980,000

N

1 0.5 0 1 2 Miles