US Army Corps
of Engineers
Wilmington District

REPORT OF SEDIMENTATION RESURVEY

B. Everett Jordan Dam and Lake
Cape Fear River Basin, North Carolina

August 1997

B. EVERETT JORDAN DAM AND LAKE PROJECT

CAPE FEAR RIVER BASIN, N.C.

REPORT OF SEDIMENTATION RESURVEY

YEAR 1997

WILMINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
69 DARLINGTON AVE.
WILMINGTON, NC 28402

AUGUST 1997

FINAL REPORT

B. EVERETT JORDAN DAM AND LAKE PROJECT
1997 SEDIMENTATION RESURVEY
CAPE FEAR RIVER BASIN
NORTH CAROLINA

OSI REPORT NO. 97ES021.2

Prepared For: U.S. Army Corps of Engineers
Wilmington District
69 Darlington Ave.
Wilmington, NC 28403

Prepared By: Ocean Surveys, Inc.
91 Sheffield St.
Old Saybrook, CT 06475

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B. EVERETT JORDAN DAM AND LAKE PROJECT
CAPE FEAR RIVER BASIN, N.C.
REPORT OF SEDIMENTATION RESURVEY
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B. EVERETT JORDAN DAM AND LAKE PROJECT
CAPE FEAR RIVER BASIN, N.C.
REPORT OF SEDIMENTATION RESURVEY
YEAR 1997

PERTINENT DATA

Location of dam

On Haw River, at latitude 35° 34' and longitude 79° 04', in Chatham County, North Carolina; 4.2 miles above the mouth of Haw River; 59.2 miles above Fayetteville, N.C.; 174.2 miles above Wilmington, N.C.; and 202.2 miles above the mouth of the Cape Fear River.

Purpose

For flood control, recreation, fish and wildlife enhancement, water supply, and low-flow release for water quality control.

Drainage areas (square miles)

Haw River above Jordan Dam	1,690
Haw River above mouth	1,705
Cape Fear River above mouth	9,140

Estimated natural streamflow at damsite (cubic feet per second)

Mean discharge for period of record (68 years)	1,631
Minimum discharge:	
Instantaneous (13 September 1954)	5.4
Daily (20 September 1953)	8
Monthly (October 1951)	60
Maximum discharge:	
Highest known (6 September 1996)	123,666
Monthly (September 1945)	10,000
Bankfull discharge (approximate for downstream reach)	20,000

PERTINENT DATA – Continued

Elevations (feet, mean sea level)

Dam:

Top	266.5
Base	154.0

Reservoir:

Spillway design flood	261.5
Standard project flood	246.2
Flood of record (September 1945)	242.1
Top of flood control pool (spillway crest)	240.0
Top of conservation pool (bottom flood pool)	216.0
Bottom conservation pool	202.0
Upper clearing limit	217.0

Tail water:

Spillway design flood	201.5
Standard project flood	186.0
Flood of record (September 1945)	174.0
Minimum	158.1

Reservoir

Counties affected	Chatham, Wake, Orange, Durham

Length at elevation 216 (miles):

Along Haw River	5
Along New Hope River	18
Length of shoreline at elevation 216 (miles)	200

PERTINENT DATA – Continued

	Inches-	Acre-feet
Storage volumes:		
Spillway design flood, elevation 261.5	-	1,646,560
Top of flood control pool, elevation 240.0	-	753,560
Top of conservation pool, elevation 216.0	-	215,130
Bottom of conservation pool, elevation 202.0	0.83	74,700
Uncontrolled flood storage (240.0-261.5)	9.91	893,000
Controlled flood storage (216-240)	5.97	538,430
Conservation storage (202-216)	1.56	140,430
Water supply	0.51	45,810
Water quality	1.05	94,620
Surface area (acres):		
Top of flood control pool, elevation 240.0		31,800
Top of conservation pool, elevation 216.0		13,940
Bottom of conservation pool, elevation 202.0		6,660

Dam and spillway

Type – Earth and rockfill (zoned), with side channel uncontrolled spillway, a multilevel intake structure, and oblong-shaped conduit.

Length of dam (feet)	1,330
Length of spillway crest (feet)	800
Spillway capacity of elevation 261.5 (c.f.s.)	259,000
Height of dam (feet)	113
Freeboard (feet)	5.0
Conduit equivalent diameter (feet)	19.0
Maximum discharge at elevation 216 (c.f.s.) (approx.)	14,000

Dam and spillway – continued

Intake tower:

Conduit intakes:

Number	2
Size	9' wide x 19' high, each
Invert elevation (feet MSL)	150

Multilevel intakes:

Number	8
Type	Drop-inlet
Size:	
Front	Two, 6 feet square, invert elevations 181' and 188'
Front	Two, 8 feet square, invert elevations 197' and 209'
Left side (east)	Two, 8 feet square, invert elevations 201' and 203'
Right side (west)	Two, 8 feet square, invert elevations 205' and 207'

Stilling basin:

Minimum width (feet-inches)	16-8
Maximum width (feet-inches)	57-3
Length (feet-inches)	239-6
Still elevation (feet MSL)	148.0
Bottom elevation (feet MSL)	143.0

B. EVERETT JORDAN DAM AND LAKE PROJECT
CAPE FEAR RIVER BASIN, NORTH CAROLINA
REPORT OF SEDIMENTATION RESURVEY
YEAR 1997

INTRODUCTION

1. This report is prepared in accordance with EM 1110-2-4000, dated 15 December 1989, and presents the results of the second resurvey (1997) for sedimentation in the B. Everett Jordan Dam and Lake project.

2. Purpose and Scope. The purpose of this investigation was to determine the distribution and rate of sedimentation in the lake since the initial survey of sediment ranges (1979) and since the first resurvey (1990).

PROJECT DESCRIPTION AND CHRONOLOGY

3. Brief Project Description. B. Everett Jordan Dam is located on the Haw River approximately 4.2 miles above its mouth in Chatham County, North Carolina, in the upper northeast portion of the Cape Fear River Basin. The main body of the lake extends up the New Hope River into parts of Wake, Durham, and Orange Counties, with the upper end of the lake being between Durham and Chapel Hill, North Carolina. Jordan Dam is an earth and rockfill dam with a saddle spillway, four saddle dikes, an intake tower having two conduit intakes and eight multilevel intakes for water quality discharges, and an oblong-shaped conduit through the dam. B. Everett Jordan Dam and Lake is a multiple purpose project constructed for the purpose of flood control, recreation, fish and wildlife enhancement, water supply, and water quality control. The initial total capacity was 753,560 acre-feet at spillway crest elevation of 240.0 feet mean sea level (MSL). Allocated storage capacities corresponding to preimpoundment and resurvey conditions are shown in Table A on page 10. The reservoir area is shown in Figure 1 in Appendix A. The reservoir capacity curves are presented in Appendix A, Figure 4.

4. Plan of Operation. The plan of operation provides for maintaining a normal pool elevation of 216 feet MSL, by releasing inflows so as not to exceed non-damage stages. During periods of normal flow, releases from the reservoir will equal inflow. During floods, runoff is stored in the flood pool until discharges can be released up to bankfull stages downstream. A minimum instantaneous flow of 40 cubic feet per second (c.f.s.) will always be maintained immediately below the dam. Releases will be made from the conservation pool as necessary to maintain a minimum water quality flow of 600 c.f.s. on the Cape Fear River at Lillington, N.C.

5. Brief History of B. Everett Jordan Dam and Lake Project. The Jordan project (originally named New Hope Reservoir) was first considered in the early 1930's as a result of actions called for in House Document No. 308. It was authorized by Public Law 88-253 on 30 December 1963. Actual construction did not begin until December 1970. A water quality lawsuit, seeking to enjoin the U.S. Army Corps of Engineers from further construction of the project, was filed on

10 August 1971 by the Conservation Council of North Carolina. After considerable litigation, an injunction stopping construction of the project was issued by the courts in February 1973, which ultimately delayed completion of the dam until 31 January 1975 (a delay of 11 months). A "Notice of Decision to Impound Water" by the Corps was issued on 28 July 1977 sustaining the Corps' decision to impound. An appeal by the plaintiffs was denied 25 January 1979. The project functioned as a "dry reservoir" with numerous temporary lake rises. Jordan Lake reached the normal pool elevation of 216.0 feet MSL, on 4 February 1982. The highest lake level to date occurred on 12 September 1996 at elevation 233.59 feet MSL.

DRAINAGE AREA DATA

6. Watershed Characteristics. The Haw River, rises in eastern Forsyth County at an elevation of about 1,000 feet MSL. It flows northeast, then east, and then southeast for the greatest part of its length of about 90 miles. The Haw River and tributaries are subject to sharp rises and flash floods. This is due to the rolling topography, steep gradients, narrow valleys, and the predominantly heavy clay soils, which are conducive to high runoff. The largest tributary of the Haw River is the New Hope River which joins the Haw River 0.3 miles above B. Everett Jordan Dam. The New Hope River is unique in the Piedmont because of its broad, flat flood plains in Durham County in the upper portion of Jordan Lake impoundment. The total drainage area above B. Everett Jordan Dam is 1,690 square miles.

7. Topography. The Piedmont Plateau, from which the Haw River rises, extends eastward from the Appalachian Mountains to the Sand Hills region and consists largely of rolling hills and deeply eroded valleys. The hills in the region are largely forested. The highest elevations in the region vary from 1,000 feet MSL in the headwaters to about elevation 150 feet MSL at the B. Everett Jordan Dam. In the Piedmont region the rivers generally flow through a series of falls, rapids, and pools.

8. Land Use. The Cape Fear River Basin, as a whole, is rural. Approximately 60 percent of the land area is forested, 30 percent is in row crops, and 5 percent is pasture and urban areas, each.

9. Climate. Moderate temperatures generally prevail in the drainage area above the B. Everett Jordan Dam. The average annual temperature is around 60 degrees Fahrenheit (°F), with recorded extremes of -9 to 107 °F.

10. Streamflow. The average annual runoff at the Jordan damsite during the period of January 1929 to January 1997 is 1,631 c.f.s. The discharge has varied from extremes of 0.003 to 73.2 c.f.s. per square mile during this period. Floods have occurred in all seasons of the year up to a maximum discharge of 123,666 c.f.s. in September 1996. Recorded data indicate that the maximum stages of record resulted from the September 1996 flood with a flow of 123,666 c.f.s. Lake elevations and inflows since are shown in Figures 2 and 3 in Appendix A.

11. Original Sedimentation Storage Allocation. The original estimated annual rate of sedimentation in Jordan Lake of 0.5 acre-foot per square mile of drainage area was based on reservoir sediment survey data relative to the Cape Fear River Basin, as published in

Sedimentation Bulletin No. 5, dated August 1953, entitled "Summary of Reservoir Sedimentation Surveys for the United States through 1950." In the project documentation, the sedimentation storage allocation was determined to be 42,250 acre-feet for a 50-year project life. The sedimentation storage allocation was later revised to 85,000 acre-feet on the basis of a 100-year project life and previous capacity curves. However, initial sediment storage below elevation 202.0 feet, MSL, was 74,700 acre-feet which would equate to an annual sedimentation rate of 0.44 acre-foot per square mile of drainage area for the 100-year life of the project. The annual sedimentation rate appears to be adequate in light of sedimentation rates encountered in reservoirs in an adjacent river basin. Pre-impoundment surveys made by the U.S. Geological Survey (1970-1979) of suspended sediment samples taken upstream of the B. E. Jordan damsite on the Haw and New Hope Rivers has average annual suspended-sediment yields of 260 and 80 tons per square mile, respectively. Assuming the 90 percent of the sediment would be trapped in the lakes, a Geological Survey report states that approximately 140 acre-feet (0.08 acre-feet/square mile of drainage area) of sediment would be trapped annually, providing that the environment and hydrologic conditions remain virtually the same.

SEDIMENT EVALUATION PLAN

12. Plan The volume and distribution of sediment deposited in B. Everett Jordan Lake will be determined by making periodic surveys of established ranges across the reservoir, usually about once every fifteen years, or after a major flood.

13. Location of Sedimentation Ranges. The ranges, in general, are spaced about 1 to 2 miles apart across the main lake and tributary arms from the dam to the upper limits of the top of the flood control pool, as indicated on Appendix A, Figure 1. A total of 55 ranges are above the dam and three degradation ranges are downstream of the dam. Each sedimentation range is marked with permanent concrete monuments located at approximately elevation 216 feet MSL (top of conservation pool) and about elevation 240 feet MSL (top of flood control pool). The ranges and monuments were initially surveyed during the period of September 1978 to August 1979. They were resurveyed in 1989-1990 and in 1996.

14. Horizontal and Vertical Control of Monuments. All monuments are tied into the U.S. Coast Guard and Geodetic Survey (USCGS) monumentation network and the North Carolina State plane coordinate system. Each range line monument was located by running a horizontal traverse of a closed loop having a closing error of no more than 0.02 percent. Vertical control is at least of third-order accuracy. The elevation of each monument was determined by running a vertically controlled loop from the nearest vertical bench mark having a USGS elevation to the monument and stamped with its individual range line identification number and elevation. Appendix D shows the elevation and North Carolina State plane coordinates (NAD-83) of each monument. Appendix D also shows the bearing of each sedimentation range line.

15. During the 1997 resurvey, the actual position of some of the monuments was found to be significantly different from the published coordinates. These changes have been made in the updated coordinates list (Appendix D), however, a complete check of all the monument coordinates was not within the scope of the 1997 resurvey. As is discussed in paragraph 29, it is

most important that each range be resurveyed along the line established by the original monuments.

16. The published coordinates for the monumentation along the K2, H5, and NH6 sedimentation ranges disagreed with the stampings on the monuments. Along these ranges the A and B monuments actually are located in the positions published for the D and C monuments and vice versa. The monument coordinates for these ranges have been updated in Appendix D and the profiles are now correctly presented in Appendix C (they no longer show mirror images of the true profiles).

17. Original Survey. The initial cross sections were surveyed with a level, rod and tape except for the river and creek crossings which were too deep to permit wading. At the deeper river and creek crossings, sections were taken by electronic soundings. The initial survey of sections within the B. Everett Jordan Lake area was conducted from the fall of 1978 to the spring of 1979 before the lake was impounded.

18. 1988-1990 Resurvey. During the period from the spring 1988 to the summer of 1990, two private surveying contractors and the U.S. Army Corps of Engineers survey vessel, Wanchese, were utilized to resurvey the sedimentation cross sections within B. Everett Jordan Lake. Survey data developed by the private contractors, the Wanchese, and the original survey data were tied into the North Carolina Coordinate System. Conventional survey methods were utilized to resurvey the natural and shallow portion of the cross sections, while the deep portion of the cross sections were surveyed utilizing electronic echo sounding equipment. The maximum distance between elevation points on all cross sections was set at 100 feet.

19. 1997 Resurvey. The second resurvey was conducted during the spring and summer of 1997 by Ocean Surveys, Inc. (OSI) in association with Davis-Martin-Powell and Associates, Inc. OSI completed the hydrographic surveying of the sedimentation ranges' submerged portions and Davis-Martin-Powell completed the land surveys.

20. All land survey work was completed in accordance with U.S. Army Corps of Engineers third order Class II accuracy or better. The Davis-Martin-Powell surveyors used a Topcon GTS-301D Total Station to survey the sedimentation ranges. On each range the field crew cut a line of sight and surveyed along the portions of the range line that were above the lake surface. The land surveyors also collected data down to three feet below the lake surface to provide overlaps with the hydrographic data. Elevations are accurate to the nearest 0.1 foot and were taken at least every 25 feet or as necessary to properly define elevation changes along the profile.

21. The position and elevation values along each sedimentation range profile are referenced to the range's control monuments. OSI and Davis-Martin-Powell updated the coordinates (in North Carolina State Plane) of any monument where the published position inaccurately reported the monument's location relative to the other monuments along the range line. The 1997 resurvey is based on the updated monument positions.

22. The OSI field crew used a fleet of three survey vessels (Photos 1 and 2 on page 6) to achieve the versatility needed to complete the hydrographic survey of B. Everett Jordan Lake and its tributaries: a 24-foot outboard vessel, a 21-foot shallow-draft boat, and a 16-foot flat-bottom jonboat. Surveying was conducted in line with the monumentation regardless of that line's position with respect to the sediment range's published position. The survey conforms to the Class I hydrographic survey standards established by the U.S. Army Corps of Engineers.

23. Survey vessel navigation, trackline control, and position fixing were accomplished by employing a Trimble 4000 Differential Global Positioning System (GPS) interfaced with OSI's PC-based hydrographic software package "Maretrack II." Differential GPS involves applying correctors to the ranges sent by the GPS satellites to achieve more accurate positioning. An OmniStar 7000 was installed onboard; this system uplinks to a geosynchronous satellite that sends the appropriate correctors. Using this differential GPS system better than three-foot accuracy in horizontal position is achieved.

24. Precision water depth measurements were obtained using an Innerspace 448 depth sounder configured with a custom-mounted 3 degree 200 kHz transducer. The specially-designed transducer mount was constructed to keep the transducer plumb and stable during surveying. During survey operations, digital depths output from this system were merged with navigation data via the Maretrack II program, which subsequently computed the precise position of each sounding. All values were stored on computer disk for post-survey processing.

25. At the beginning of each day a "bar check" was conducted to calibrate the depth sounding system for the speed of sound throughout the water column. This bar check was done at the deepest location in the area to be surveyed that day. Two additional bar checks were completed each day: one at midday and one at the end of the survey day near the location of the first bar check. Multiple bar checks reveal any changes in the speed of sound during the day. They either verify the maintenance of the day's pre-survey calibration or provide the information necessary to adjust the acquired soundings.

26. At the time each range line was surveyed, a lake level at the sedimentation range location was taken (Photo 3 on page 9). The OSI field team obtained this information by means of a level run between one of the range monuments and the water surface. Using this lake level, the water depth measurements were converted into bottom elevations.

27. The hydrographic data were thinned to five-foot horizontal data spacing and merged with the land survey data to create profiles for each sedimentation range. Using AutoCAD the cross-sectional area of every profile for each ten-foot elevation block was calculated. These data are listed in Appendix B, Table 7.

28. Determination of Capacities and Sediment Volumes. The capacities of each elevation block for every segment and the corresponding cross-sectional areas (end areas) of the sedimentation ranges were calculated during the original survey (Appendix B, Tables 1 and 2). Dividing these volumes by the sum of the corresponding bounding cross-sectional areas yields the "effective lengths." These effective lengths characterize each ten-foot elevation block for each segment

Photo 1
OSI survey vessels used during the 1997 resurvey.

Photo 2
The 16-foot jonboat was used to survey among submerged trees and debri-lined banks.

(Appendix B, Table 3). With the effective lengths, the cross-sectional areas computed from the 1990 resurvey (Appendix B, Table 5) were translated into 1990 capacities (Appendix B, Table 4). The same method was employed in using the 1997 resurvey cross-sectional areas (Appendix B, Table 7) to obtain the 1997 capacities. These new capacities, included in Appendix B, Table 6, are then compared with original capacities and the 1990 resurvey capacities to investigate sediment accretion and erosion. A volume decrease over time indicates sediment accumulation; an increase points to erosion. Sediment volume changes, which are tabulated in Tables 8, 9 and 10 in Appendix B, are calculated by subtracting one set of capacities from another survey's capacities.

29. Since the sedimentation volume changes are only the residuals between the capacities calculated from the surveys, the validity of the calculated sediment volume changes relies heavily on each survey being conducted in the same locations. To ensure this, surveys were conducted along the line established by the actual location of the monuments on each range even if this did not correspond to the published coordinates of the range location.

SEDIMENT DEPOSITS

30. Volume and Distribution of Sediment Deposited in the Reservoir. The 1997 resurvey reveals that 6,720 acre-feet of sediment have been deposited in the reservoir since the original survey. Since the first resurvey (1990), 310 acre-feet of sediment were deposited. Although these computed sediment deposition volumes are based on the best available data, some deviation from the computed volumes of sedimentation could be possible due to inaccuracies associated with the surveys. The distribution of the changes in reservoir capacity are detailed in Figures 4-10 and Figures 12-17 in Appendix A and in Tables 8, 9, and 10 (Appendix B). The depth of the sediment is shown in cross-sectional profiles included in Appendix C and in Figure 11 (Appendix A).

31. Rate of Sedimentation. The average rate of sediment deposition during the 18.4 years which elapsed between the original survey and the 1997 resurvey is 365 acre-feet per year or 0.22 acre-feet per year per square mile of drainage area. The average sedimentation rate during the 11 year period between the original survey and the 1990 resurvey is 583 acre-feet per year or 0.34 acre-feet per year per square mile of drainage area. Between the 1997 and 1990 resurveys, the average rate of deposition is 42 acre-feet per year or 0.02 acre-feet per year per square mile of drainage area.

32. Sediment Characteristics. The drainage of the New Hope River is primarily on sedimentary rocks of sandstone, siltstone, and claystone, while the drainage of the Haw River is on crystalline rocks of granite, schiss, and slates. Sediments consist of silt and clay-sized particles with areas of high percentages of sand, especially in the upper lake area at the mouth of tributary creeks. Suspended sediment samples collected by the U.S. Geological Survey on the Haw River at the Pittsboro Gage in 1970 contained 41 percent clay, 39 percent silt, and 20 percent sand.

RESERVOIR SEDIMENTATION DATA SUMMARY

33. Reservoir sedimentation data summarized on ENG Form 1787 are shown in Appendix B.

SUSPENDED SEDIMENT PROGRAM

34. Suspended Sediment Stations. From October 1982 to November 1985, suspended sediment sampling stations were operated on the Haw River near Bynum, NC; on New Hope Creek near Blanos, NC; on Northeast Creek near Genlee, NC; on Morgan Creek near Chapel Hill, NC; and on the Haw River below B. Everett Jordan Lake Dam.

35. Collection of Suspended Sediment Data. From October 1982 to November 1985, samples were collected and analyzed for concentrations of suspended sediment by personnel of the U.S. Geological Survey.

36. Drainage Area Above Sampling Stations. The four sampling stations located upstream from the B. Everett Jordan Dam represent 1413 square miles of drainage area or approximately 84 percent of the total drainage area above the project. Suspended sediment contributed from below the sampling stations was assumed to be the same, per square mile as the area above the sampling stations.

37. Reservoir Trap Efficiency. Trap efficiency is the ability of a reservoir to trap and retain sediment and is expressed as a percent of incoming sediment which is retained in the basin. For the time period from November 1982 to December 1985, the trap efficiency using the suspended sediment data for B. Everett Jordan Lake was about 67 percent as computed below.

DISCUSSION OF THE RESULTS OF THE 1997 RESURVEY

38. Appendix C includes the sedimentation range profiles from the 1979 original survey (solid line), the 1990 resurvey (dashed line), and the profiles from the 1997 resurvey (dotted line). The profiles are plotted with fifty times vertical exaggeration and looking downstream. In general, the 1997 data reveal cross sections with features similar to those in the corresponding 1979 and 1990 profiles. A road has been cut through range B1 and results in an increase in the calculated 1997 capacity. Sediment has collected in the pre-impoundment river channels along most sedimentation ranges while the banks have eroded on many ranges (Photo 4 on page 9).

39. The following table lists the capacities of the Jordan Lake storage sections. The uncontrolled flood storage capacity is reported as 893,000 acre-feet for all three surveys. Because profile data only exist up to 240 feet MSL, changes above this elevation can not be determined by the sedimentation studies.

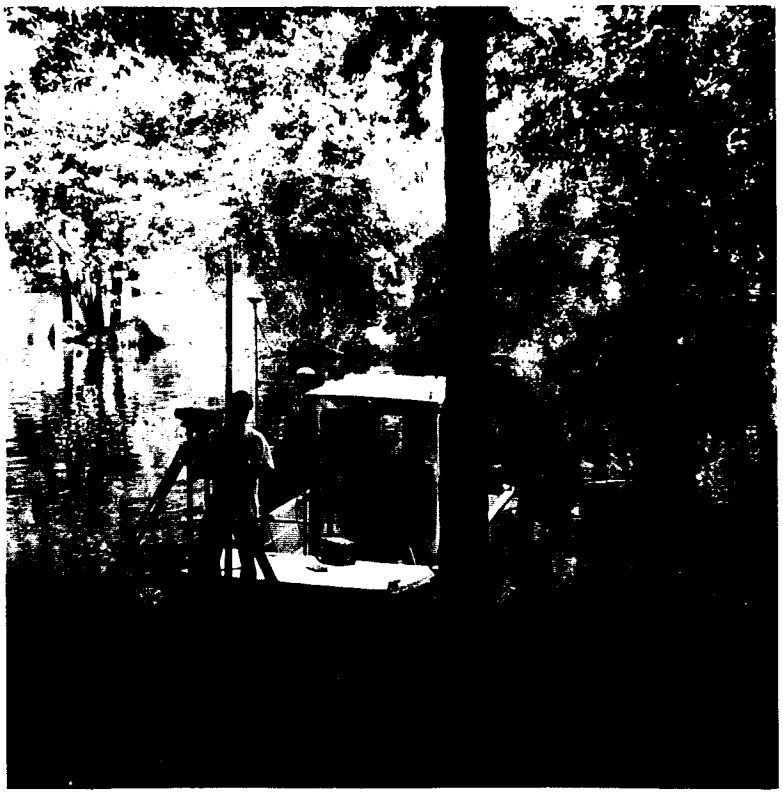


Photo 3
The OSI field crew obtaining a water level for sedimentation range H6.

Photo 4
Bank erosion along the Haw River near Jordan Dam at sedimentation range J1.

TABLE A
PROJECT CAPACITY TABLE

Storage section	Elevation range (feet MSL)	1979 original section capacity (acre-feet)	1990 section capacity (acre-feet)	1997 section capacity (acre-feet)
Uncontrolled flood storage	240.0 to 261.5	893,000	893,000	893,000
Controlled flood storage	216.0 to 240.0	538,430	537,254	538,005
Conservation pool	202.0 to 216.0	140,427	141,545	141,065
Sediment storage	150.0 to 202.0	74,700	68,348	67,767
Total	**150.0 to 261.5**	**1,646,557**	**1,640,147**	**1,639,837**

40. The table below details the sediment volume change between surveys. For the purposes of this report, the sediment volume change is the negative of the change in capacity between the original survey and the 1997 resurvey:

sediment volume change = - capacity change = - (1997 capacity - original capacity)

If the reservoir water capacity increases the sediment volume change is negative and vice versa. The only decreases in sediment volume occurred in the controlled flood storage section from 1990 to 1997 and in the conservation pool from 1979 to 1990 and 1979 to 1997. All other storage sections at every other period accumulated sediment.

TABLE B
SEDIMENT VOLUME CHANGE

Storage section	Elevation range (feet MSL)	1979 to 1990 change (acre-feet)	1990 to 1997 change (acre-feet)	1979 to 1997 change (acre-feet)
Controlled flood storage	216.0 to 240.0	1,176	-751	425
Conservation pool	202.0 to 216.0	-1,118	480	-638
Sediment storage	150.0 to 202.0	6,352	581	6,933
Total	**150.0 to 261.5**	**6,410**	**310**	**6,720**

41. The total sediment volume in the reservoir has increased by 6,720 acre-feet since the original survey. Most of this change occurred in the sediment storage section between 1979 and 1990. Jordan Lake's capacity (from 150 and 240 feet MSL) has decreased by 1 % of its original volume. Only 5 % of this overall capacity change occurred since 1990.

42. Appendix A, Figure 4 shows Jordan Lake's capacity versus elevation curves for all three surveys. This chart was derived from the volume information included in Tables 1, 4, and 6 in Appendix B. The overall shape of each curve is similar. The curves are steep from 150 to 190 feet MSL where relatively little volume is added with a given increase in elevation. Beyond 190 feet MSL the capacity increases more and more rapidly with elevation. Of the 753,557 acre-feet of original capacity from 150 to 240 feet MSL over 90 % is located above 200 feet MSL and over 50 % is above 220 feet MSL. Between 180 and 210 feet MSL the 1990 and 1997 capacity curves are farthest apart from the 1979 survey curve. This separation reveals that the largest decrease from the original capacity occurs in this elevation range.

43. 1979 to 1997 Changes. Figure 5 in Appendix A focuses on the differences between the 1979 and 1997 volumes for each ten-foot elevation interval. The 180 to 190 foot elevation block and the 190 to 200 foot block show the largest sediment accumulations; combined they account for over 4,500 acre-feet of the 6,720 acre-foot total sediment increase in Jordan Lake. The influences of the New Hope and Haw Rivers dominate the changes below 210 feet MSL (as can be seen in Appendix B, Table 10). Between 210 to 220 feet MSL there was a 855 acre-foot sediment loss; this loss is pronounced in the mid New Hope River, the lower Haw River, and Beaver Creek. The capacity decrease between 230 to 240 feet MSL occurred as a result of sediment deposition in Northeast Creek and Burden Creek.

44. The sediment volume changes for the elevation intervals are expressed as percentages of the total sediment volume change in Appendix A, Figure 7. Also plotted is the cumulative percent of sediment volume change versus elevation such that it reaches 100 % at 240 feet MSL the elevation at which all of the 6,720 acre-foot increase has been included. Approximately 82 % of the change occurred below 200 feet MSL; these elevations contain less than 10 % of the reservoir capacity.

45. Appendix A, Figure 9 portrays the sediment volume changes relative to the elevation intervals' 1979 original capacity. The interval from 150 to 160 feet MSL, with an original capacity of 92 acre-feet, has entirely filled with sediment. The capacity of the 160 to 170 foot MSL interval has decreased to around three quarters of its 1979 capacity. The elevation blocks above 170 feet MSL have changes that taper off to less than a percent of their original capacities at the highest elevation intervals.

46. 1990 to 1997 Changes. Figures 6, 8, and 10 in Appendix A depict the changes between the 1990 and 1997 resurveys; these volume changes are a component of the 1979 to 1997 changes. From 1990 to 1997, the total sediment volume increased by 310 acre-feet. Below 190 feet MSL all intervals experienced net sediment deposition with most of the accumulation occurring in the Haw River and the lower New Hope River. The 200-210 elevation block had the largest change with an accumulation of 994 acre-feet. The 190-200 foot MSL elevation interval and everywhere above 210 feet MSL decreased in sediment volume and increased in capacity. Appendix A, Figure 10 shows that the lowest elevation blocks changed most relative to their initial volume (as is the case for the 1979 to 1997 changes).

47. The Haw River and the New Hope River. Appendix A, Figure 11 shows the lowest elevation at each sedimentation range along the Haw and New Hope Rivers for all three surveys (referred to as a Thalweg plot). Since the lowest elevation along each profile is in the pre-impoundment river channel, this plot is an index of sediment deposition within the channel. At sedimentation range H6 the lowest elevation remained approximately the same. Downstream along the Haw River the channel filled in between four and fourteen feet from 1979 to 1997. The channel deepened in the upper extents of the New Hope River arm. Beyond NH10 the sediment accumulated in the channel and filled in up to 6 feet by 1997. Though the rate of increase in total sediment volume slowed between the 1990 and 1997 resurveys, the channels continued to accumulate sediment by amounts comparable to the changes between the 1979 survey and the 1990 resurvey.

48. The New Hope River comprises over 60 % of the capacity in B. Everett Jordan Lake. Figures 12, 14, and 16 in Appendix A depict the volume changes along the New Hope River from the 1979 original survey to the 1997 resurvey. Figures 13, 15, and 17 in Appendix A display changes between the 1990 and 1997 resurveys. From 1979 to 1997 the total sediment volume in this river increased by 5,982 acre-feet (a 1 % decrease from its original capacity). Over 75 % of this net deposition occurred from sedimentation range NH6 downstream to H4. The pattern between the 1990 and 1997 resurveys is more varied. While the New Hope River's total sediment volume increased by 1,172 acre-feet, the sections between NH6 and NH1 eroded significantly. This sediment volume increase in the New Hope River is over three times the magnitude of the 310 acre-foot sediment increase in the entire reservoir from 1990 to 1997.

DOWNSTREAM EFFECTS

49. Based on observations of streambed and streambank conditions on the Haw River below the B. Everett Jordan Dam during the period from 1979 to 1990, no significant erosion problems associated with the development of the project have occurred and no erosion problems are anticipated in the future. The downstream sedimentation ranges were surveyed during the 1997 resurvey; however, the corresponding profile data from the previous surveys were not available. Hence, no conclusions could be drawn concerning downstream effects since the 1990 resurvey.

CONCLUSIONS

50. The K2, H5, and NH6 sedimentation ranges have been corrected so that they no longer show incorrect mirror images of the profiles. These changes did not affect the capacities or sediment volume changes.

51. Since the 1979 original survey the B. Everett Jordan Lake has experienced net sediment accumulation; its capacity between 150 and 240 feet MSL has decreased by 1 % of its original volume. Most of this deposition occurred between the 1979 survey and the 1990 resurvey. While sediment continued to be redistributed in the reservoir, the total sediment volume increased at a slower rate between 1990 and 1997. The 6,720 acre-foot sediment volume increase from 1979 to 1997 represents a sedimentation rate of 0.22 acre-feet per square mile of

drainage area per year. This accumulation rate is slower than the 0.44 rate that the sediment storage was designed to accommodate over the 100 year project life.

52. Since the filling of the reservoir, the largest amounts of sediment have accumulated in stream channels and below 200 feet MSL. Reflecting this pattern, the sediment storage section (150 to 202 feet MSL) has decreased by 9 % of its original capacity. The conservation pool capacity increased between 1979 and 1990, decreased from 1990 to 1997, and increased overall from an original capacity of 140,427 acre-feet to 141,065 acre-feet in 1997.

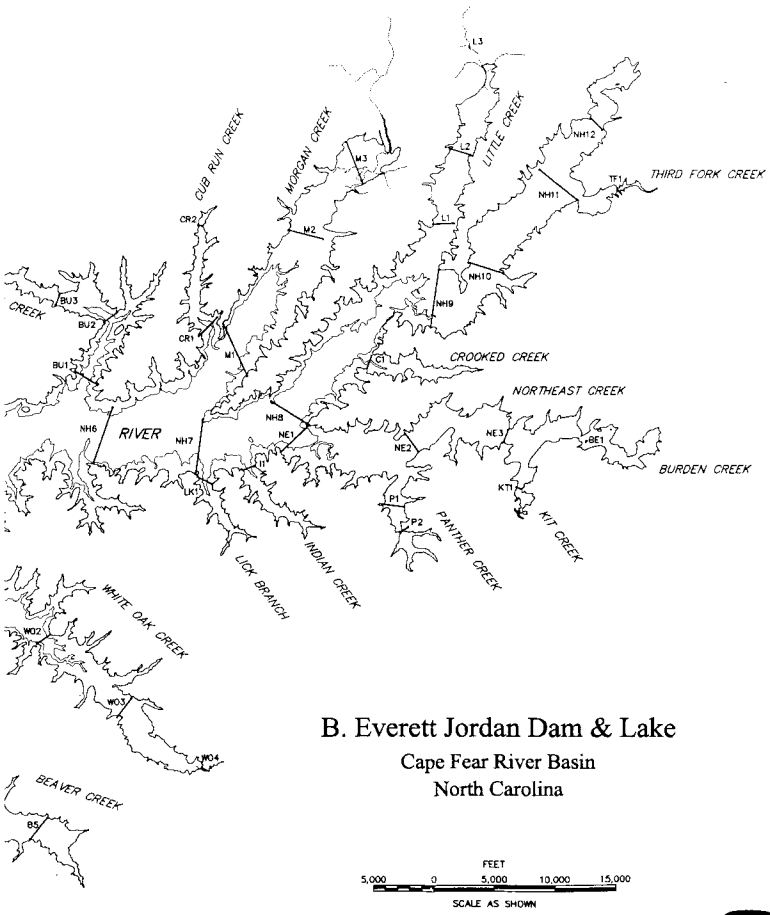
53. Results of the 1997 resurvey indicate that sedimentation does not impose a severe condition on the operation of the B. Everett Jordan project at the present time and will not create such a condition for many years in the future.

RECOMMENDATIONS

54. It is recommended that no changes be made to storage ranges or zones at this time. Due to the small differences in reservoir volume since impoundment, it is also recommended that the capacity table used since inception continue to be used. Furthermore, it is recommended that the next resurvey of sedimentation ranges be conducted in year 2012 or sooner in the event of a major flood.

APPENDIX A

FIGURES



B. Everett Jordan Dam & Lake

Cape Fear River Basin

North Carolina

FIGURE 1

Lake operation
B. Everett Jordan Dam and Lake Project

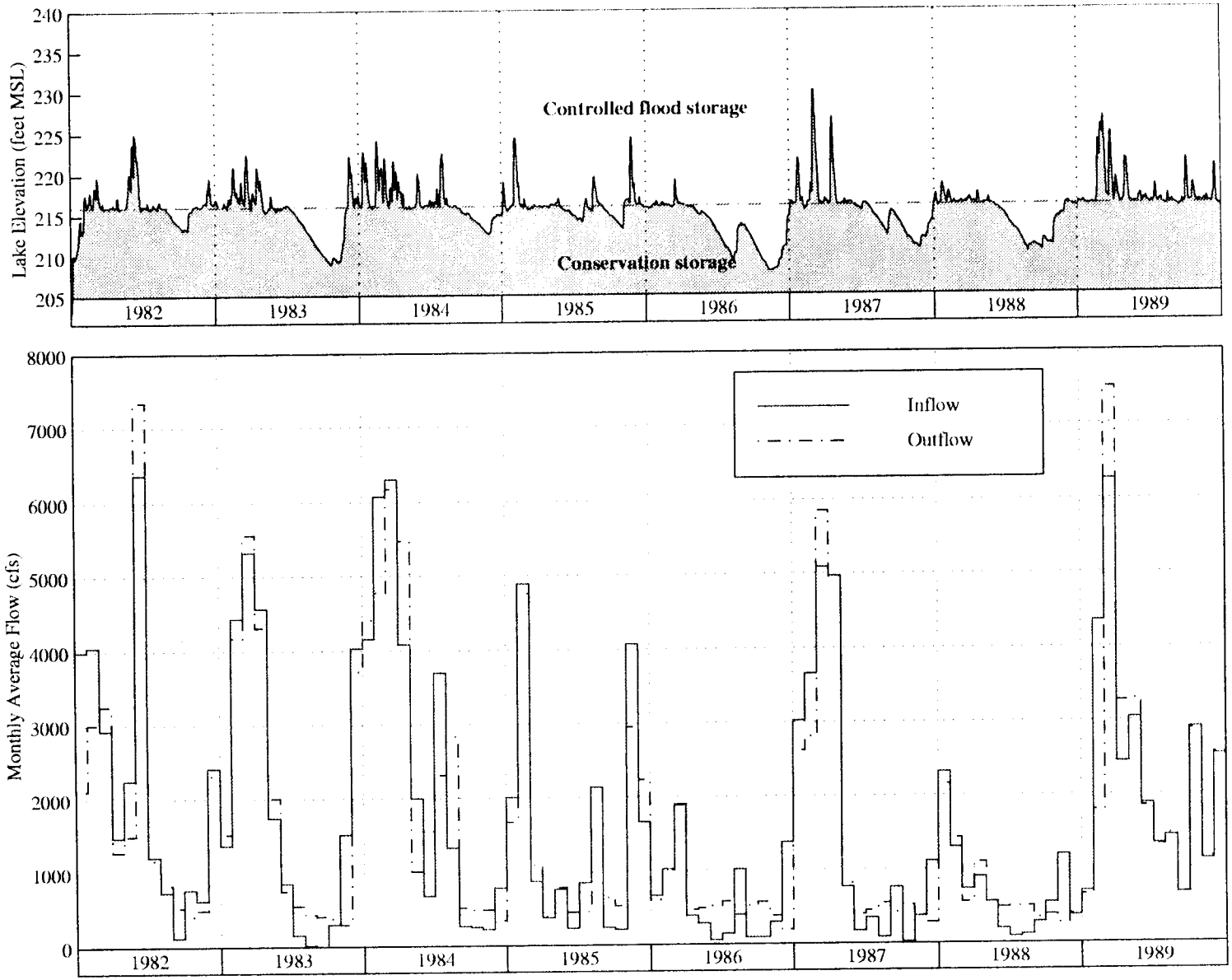


Figure 2

Lake operation
B. Everett Jordan Dam and Lake Project

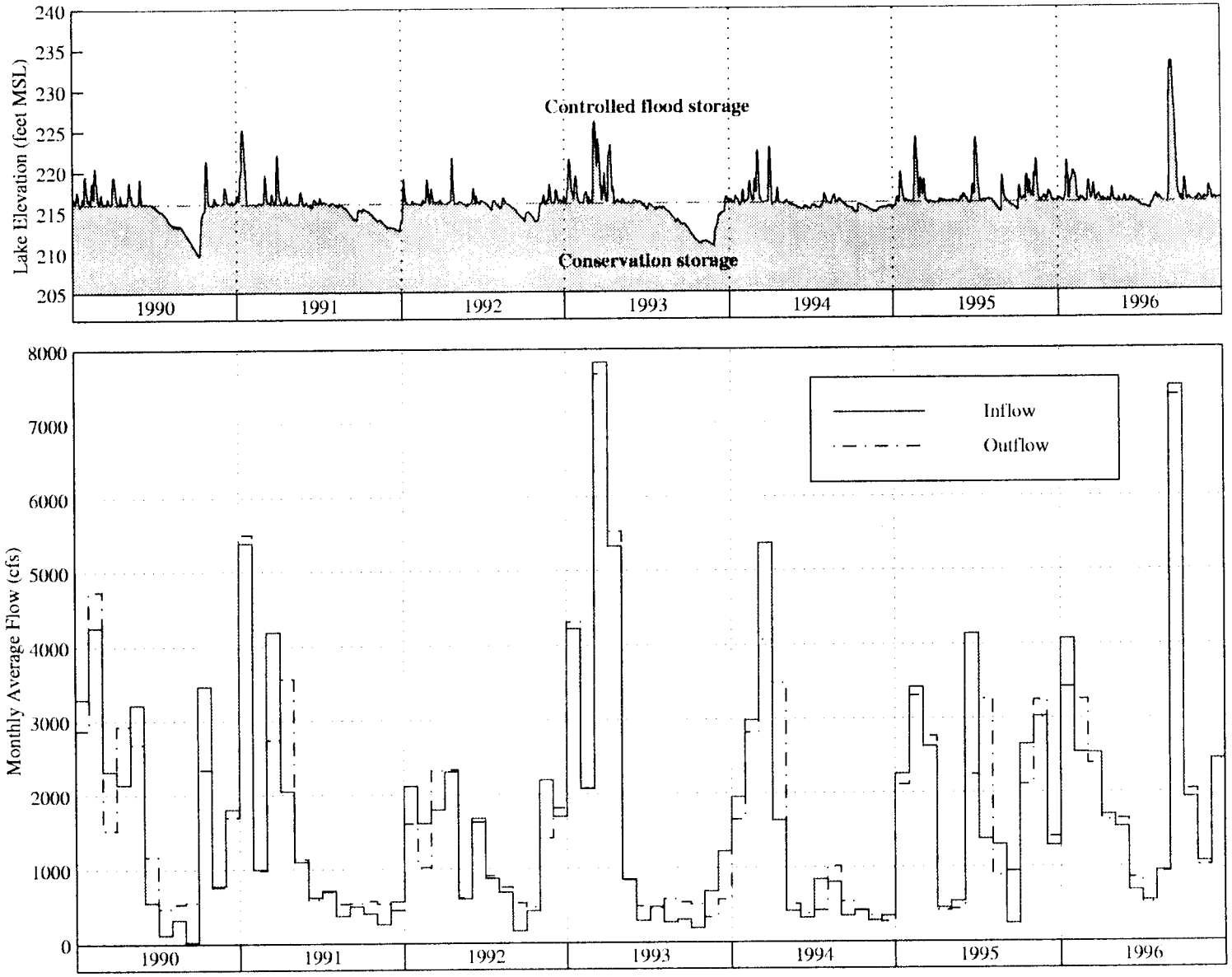
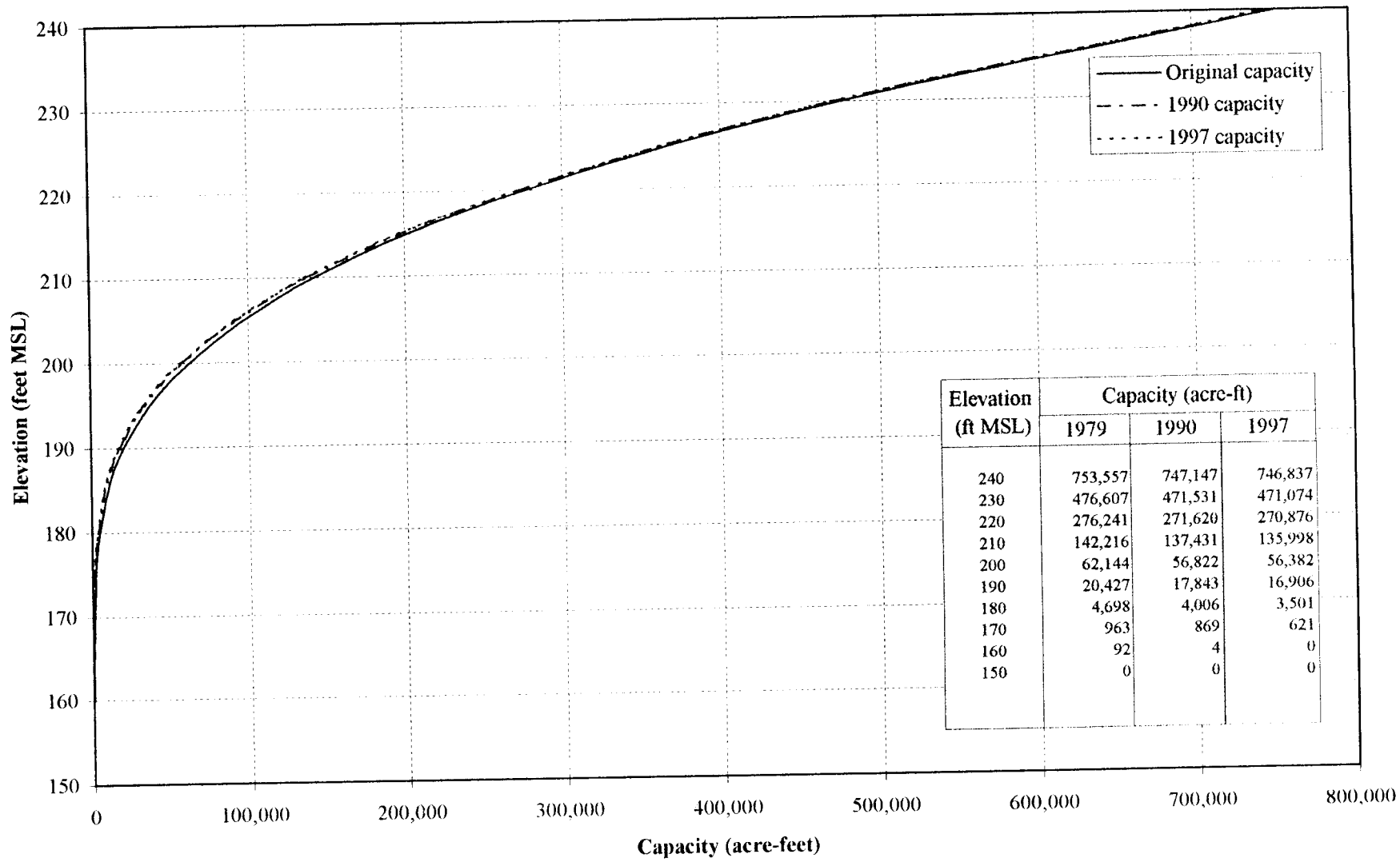


Figure 3

Lake capacity
B. Everett Jordan Dam and Lake Project



Elevation (ft MSL)	Capacity (acre-ft)		
	1979	1990	1997
240	753,557	747,147	746,837
230	476,607	471,531	471,074
220	276,241	271,620	270,876
210	142,216	137,431	135,998
200	62,144	56,822	56,382
190	20,427	17,843	16,906
180	4,698	4,006	3,501
170	963	869	621
160	92	4	0
150	0	0	0

Figure 4

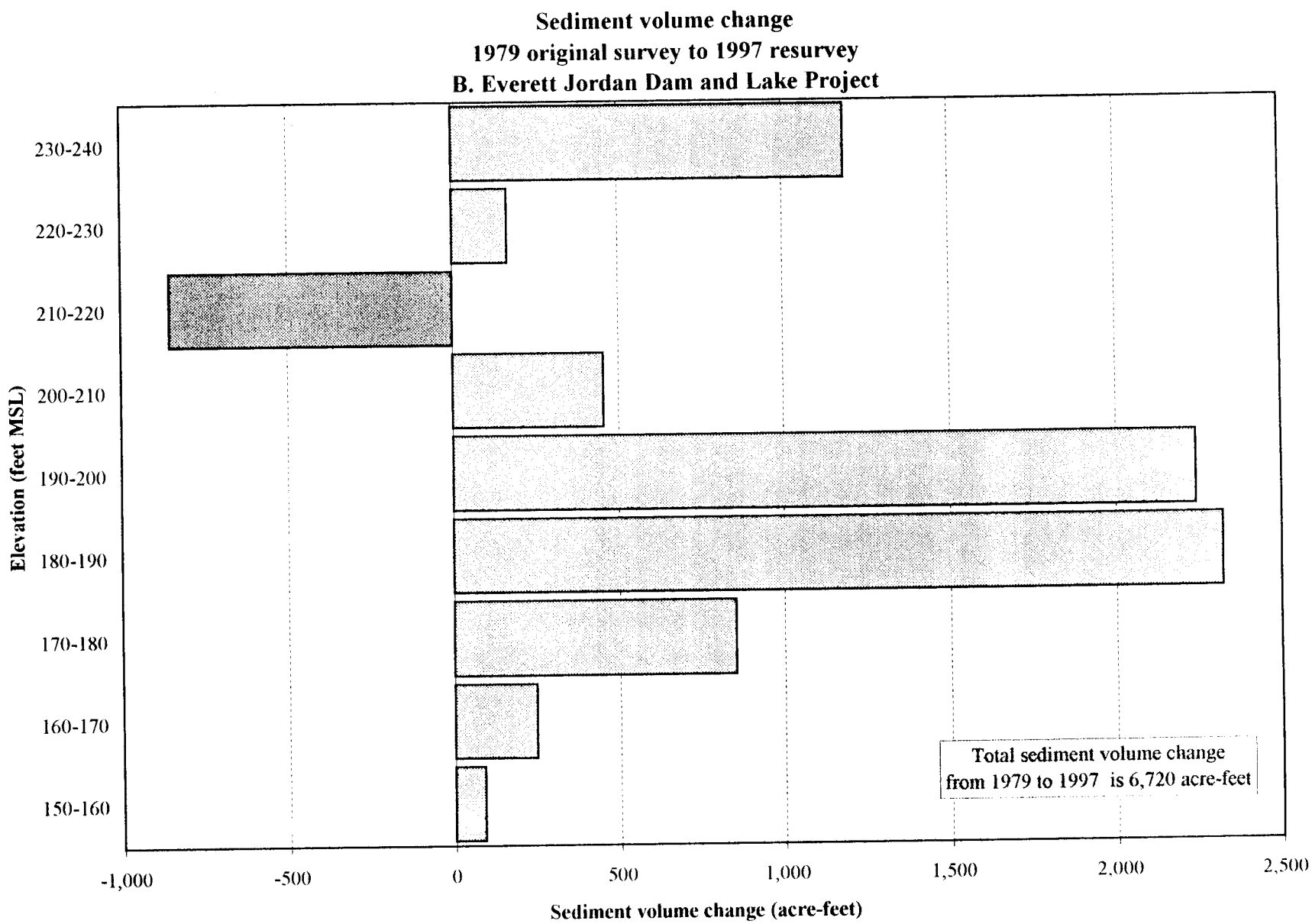

Sediment volume change
1979 original survey to 1997 resurvey
B. Everett Jordan Dam and Lake Project
Elevation (feet MSL)
230-240
220-230
210-220
200-210
190-200
180-190
170-180
160-170
150-160
-1,000
-500
0
500
1,000
1,500
2,000
2,500
Sediment volume change (acre-feet)
Total sediment volume change
from 1979 to 1997 is 6,720 acre-feet

Figure 5

Sediment volume change
1990 resurvey to 1997 resurvey
B. Everett Jordan Dam and Lake Project

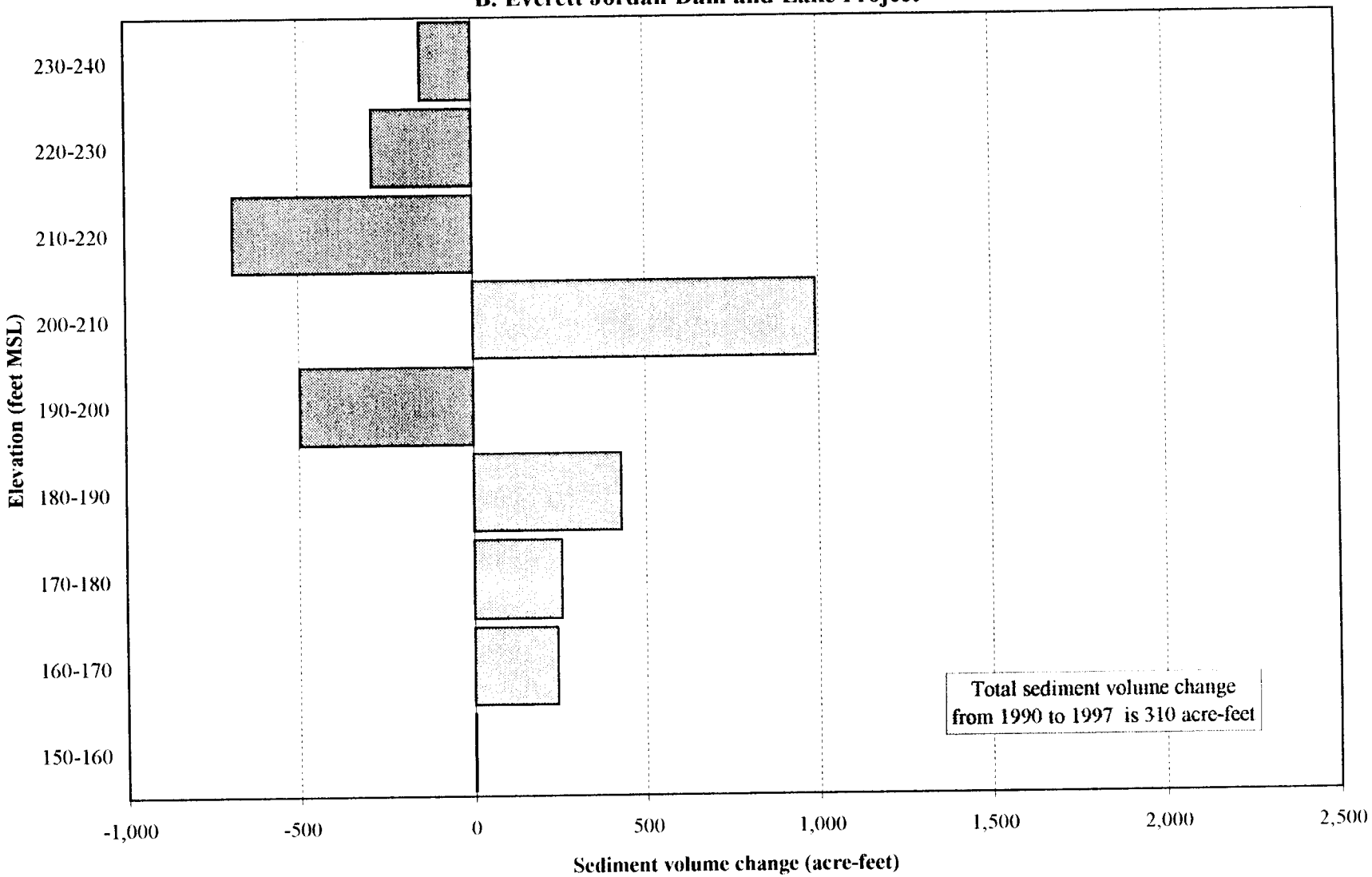


Figure 6

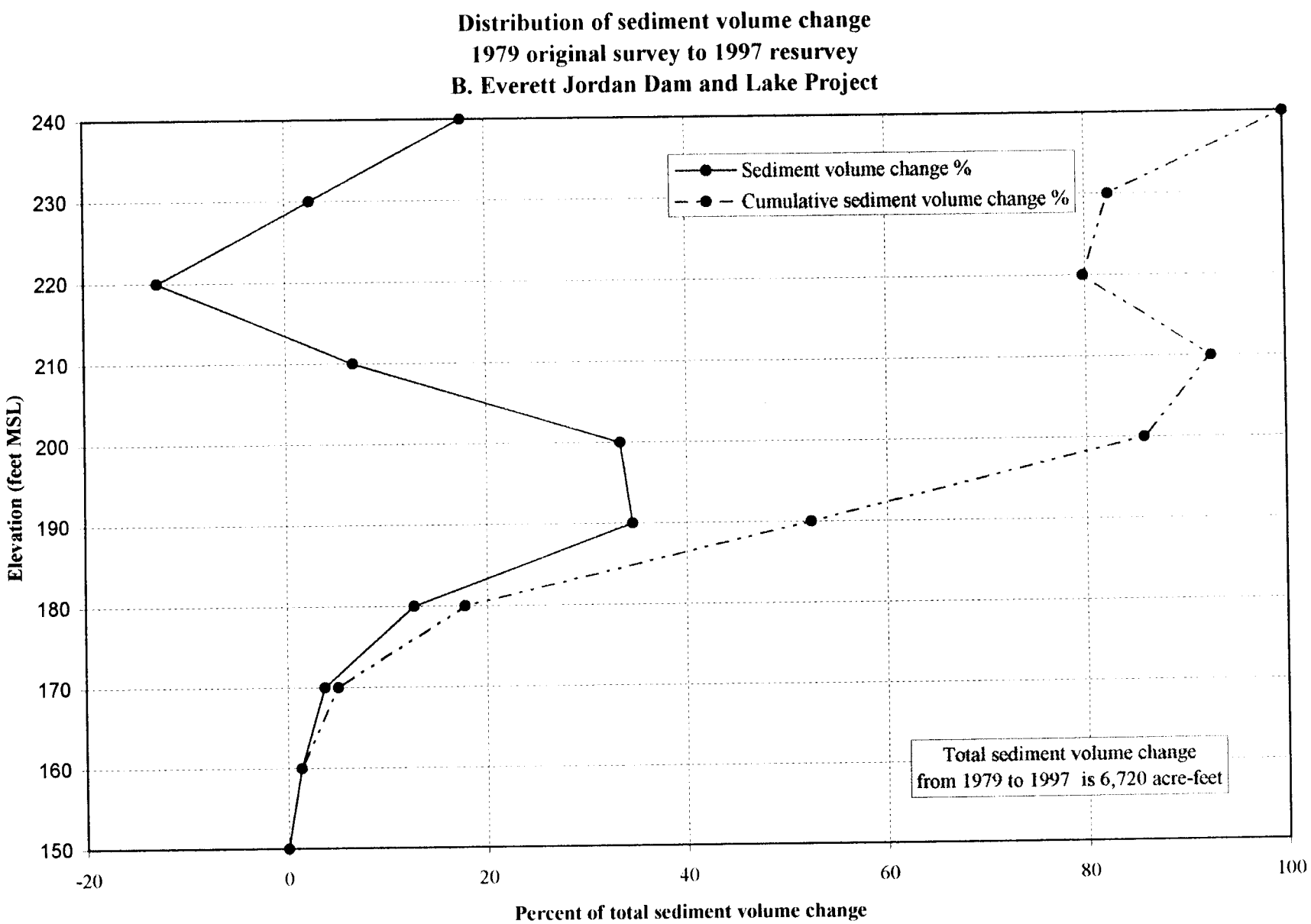

Distribution of sediment volume change
1979 original survey to 1997 resurvey
B. Everett Jordan Dam and Lake Project
Sediment volume change %
Cumulative sediment volume change %
Total sediment volume change
from 1979 to 1997 is 6,720 acre-feet
Elevation (feet MSL)
240
230
220
210
200
190
180
170
160
150
-20
0
20
40
60
80
100
Percent of total sediment volume change

Figure 7

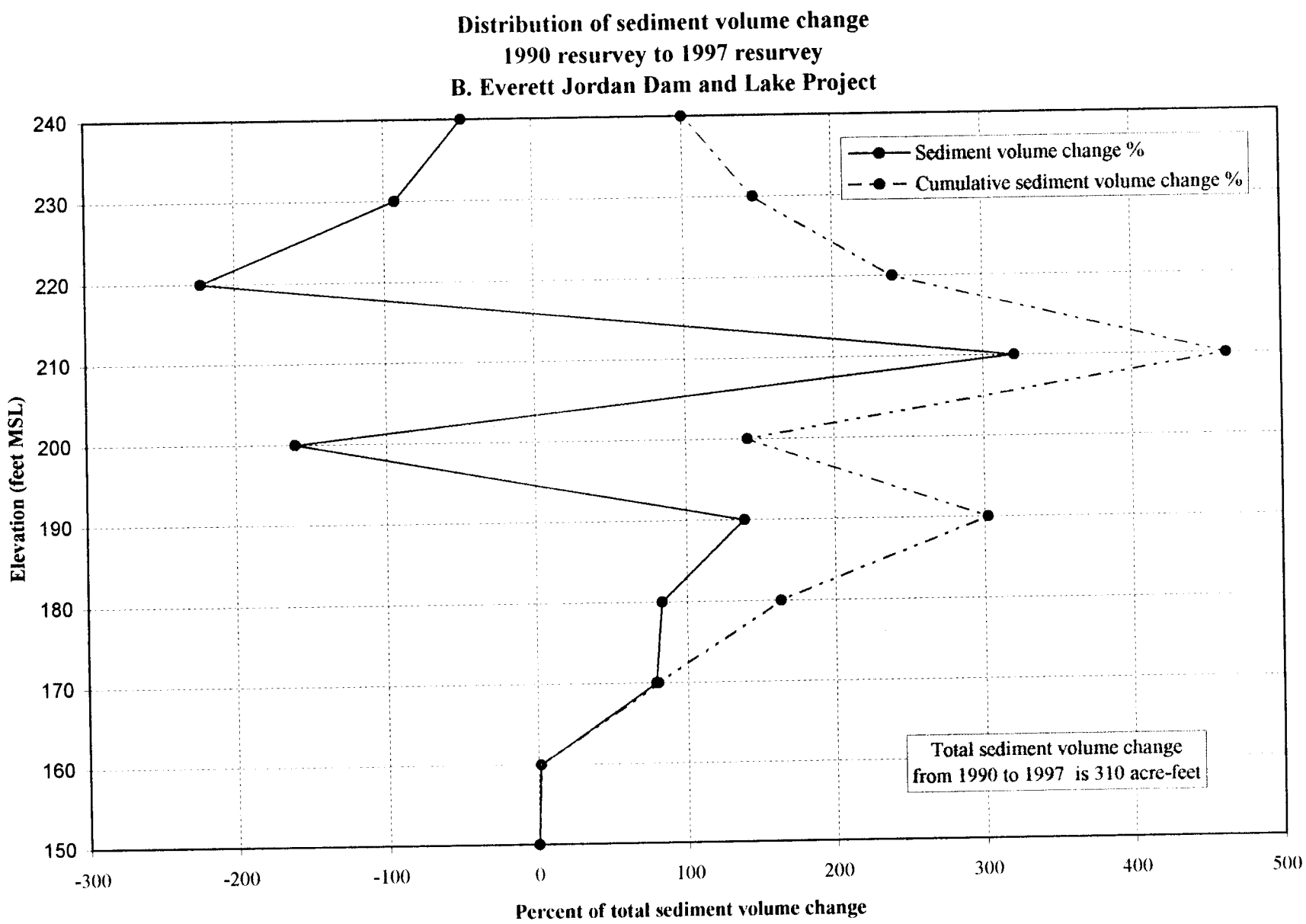

Distribution of sediment volume change
1990 resurvey to 1997 resurvey
B. Everett Jordan Dam and Lake Project
Sediment volume change %
Cumulative sediment volume change %
Total sediment volume change
from 1990 to 1997 is 310 acre-feet
Elevation (feet MSL)
240
230
220
210
200
190
180
170
160
150
-300
-200
-100
0
100
200
300
400
500
Percent of total sediment volume change

Figure 8

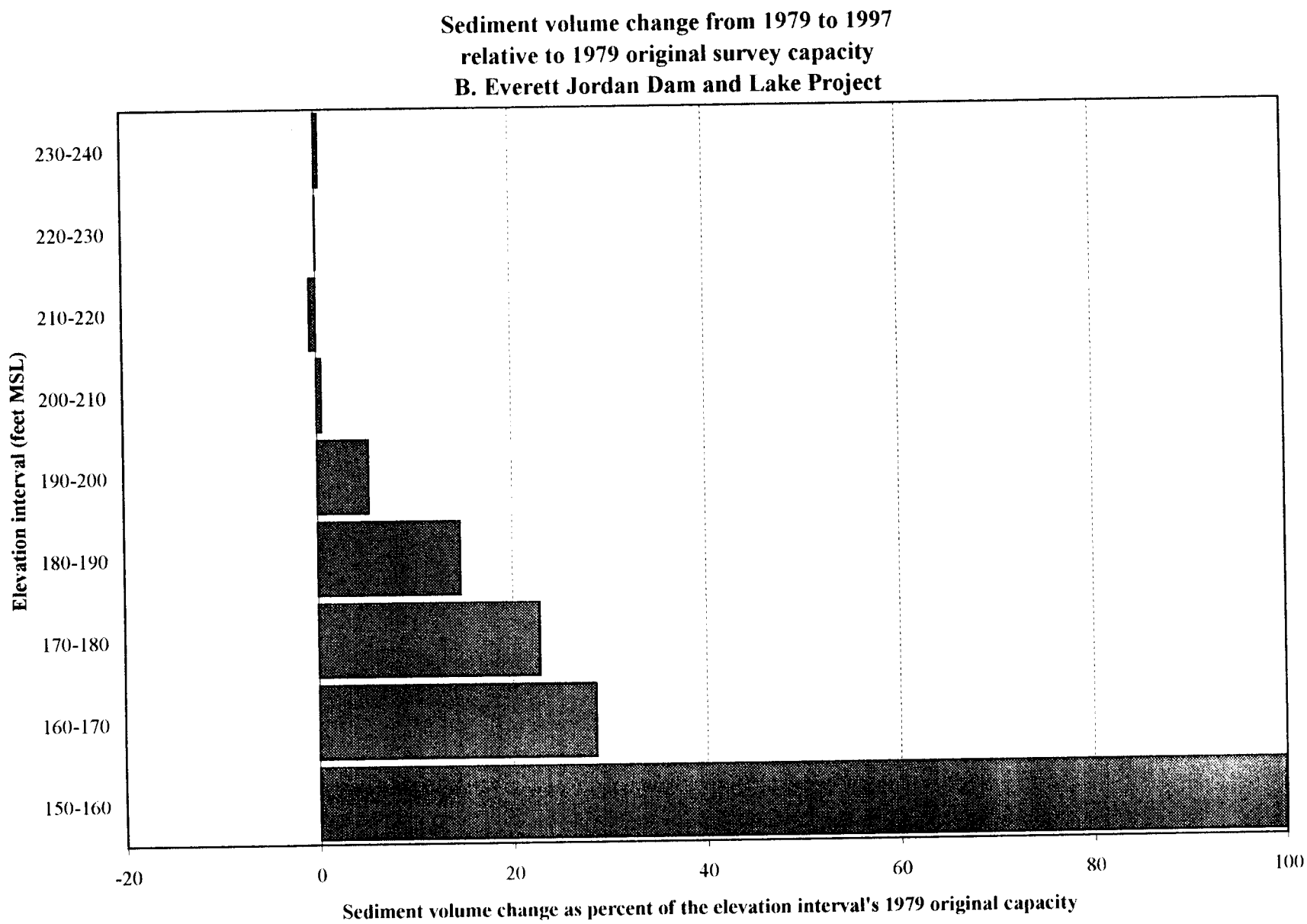

Sediment volume change from 1979 to 1997
relative to 1979 original survey capacity
B. Everett Jordan Dam and Lake Project
Elevation interval (feet MSL)
230-240
220-230
210-220
200-210
190-200
180-190
170-180
160-170
150-160
-20
0
20
40
60
80
100
Sediment volume change as percent of the elevation interval's 1979 original capacity

Figure 9

Sediment volume change from 1990 to 1997
relative to 1990 resurvey capacity
B. Everett Jordan Dam and Lake Project

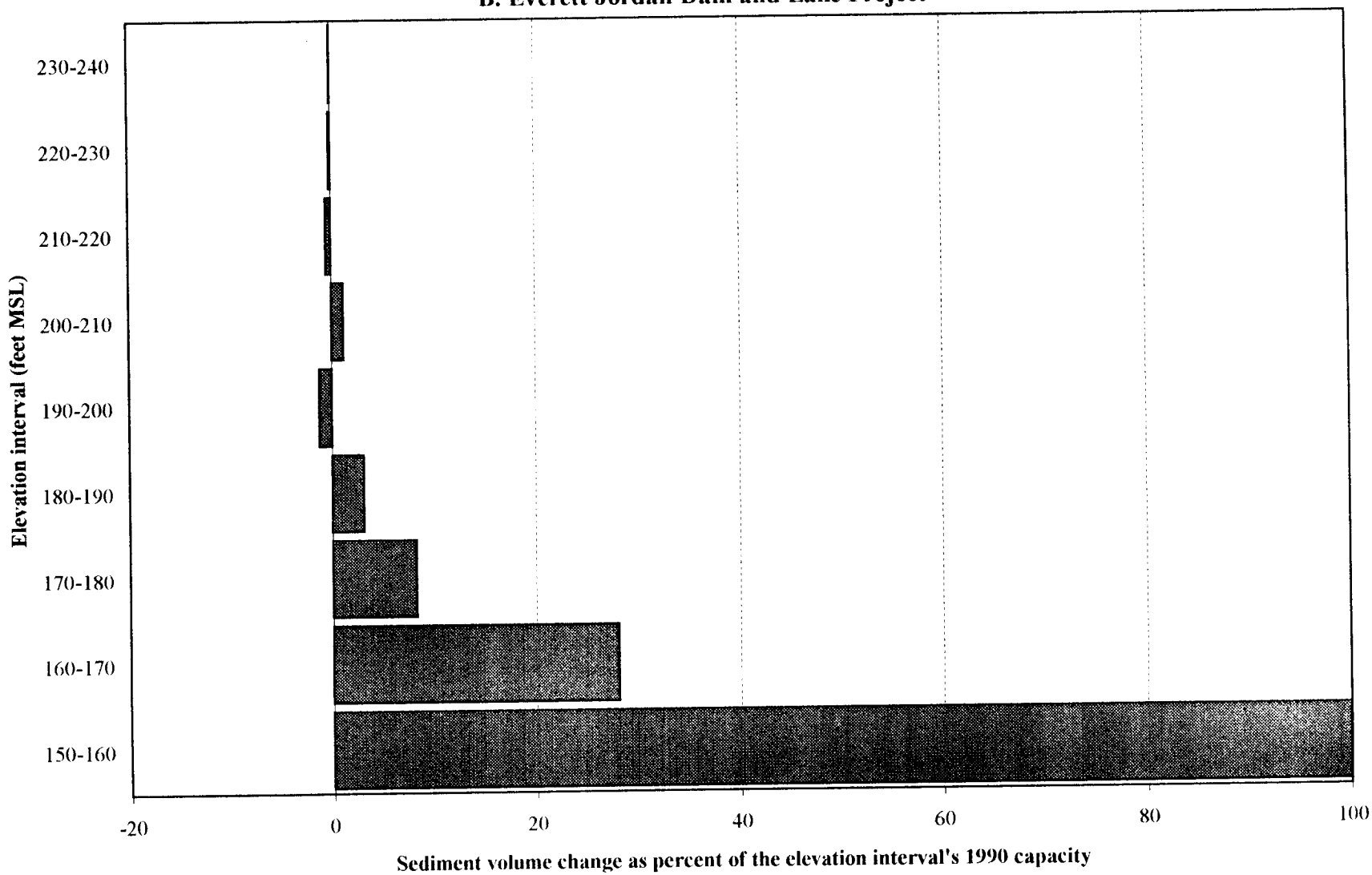
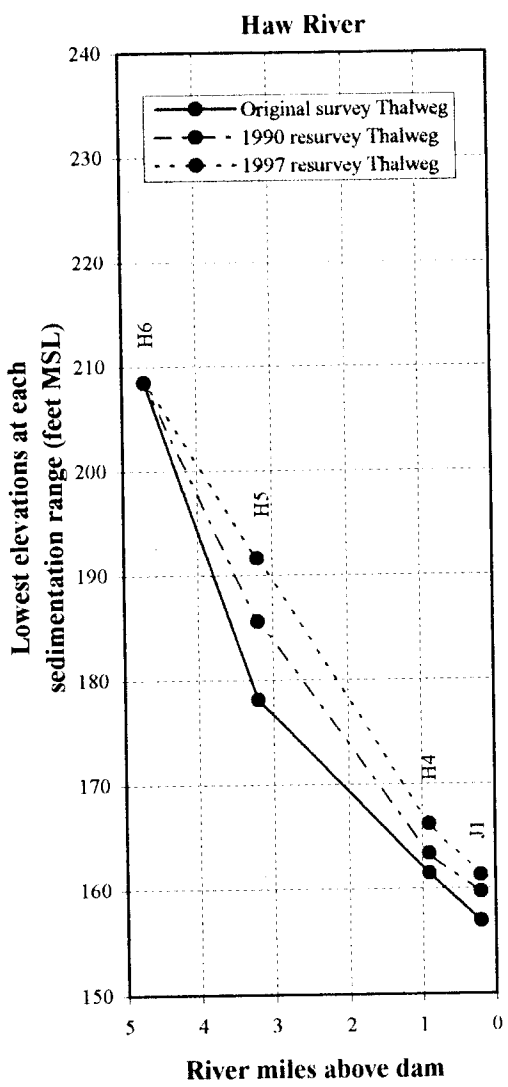


Figure 10

Lake bottom profile
B. Everett Jordan Dam and Lake Project



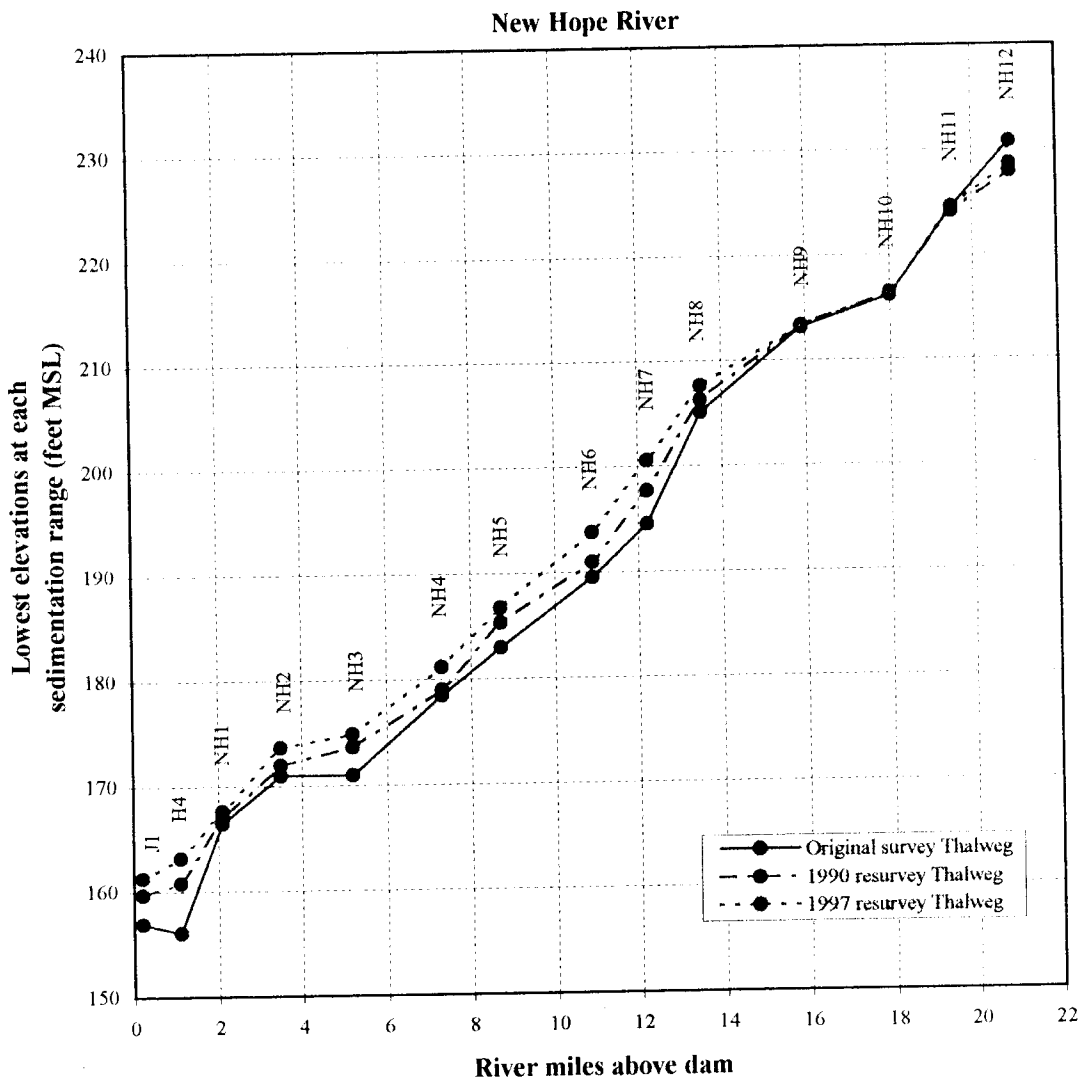


Figure 11

Sediment volume change for New Hope River sedimentation range segments
1979 original survey to 1997 resurvey
B. Everett Jordan Dam and Lake Project

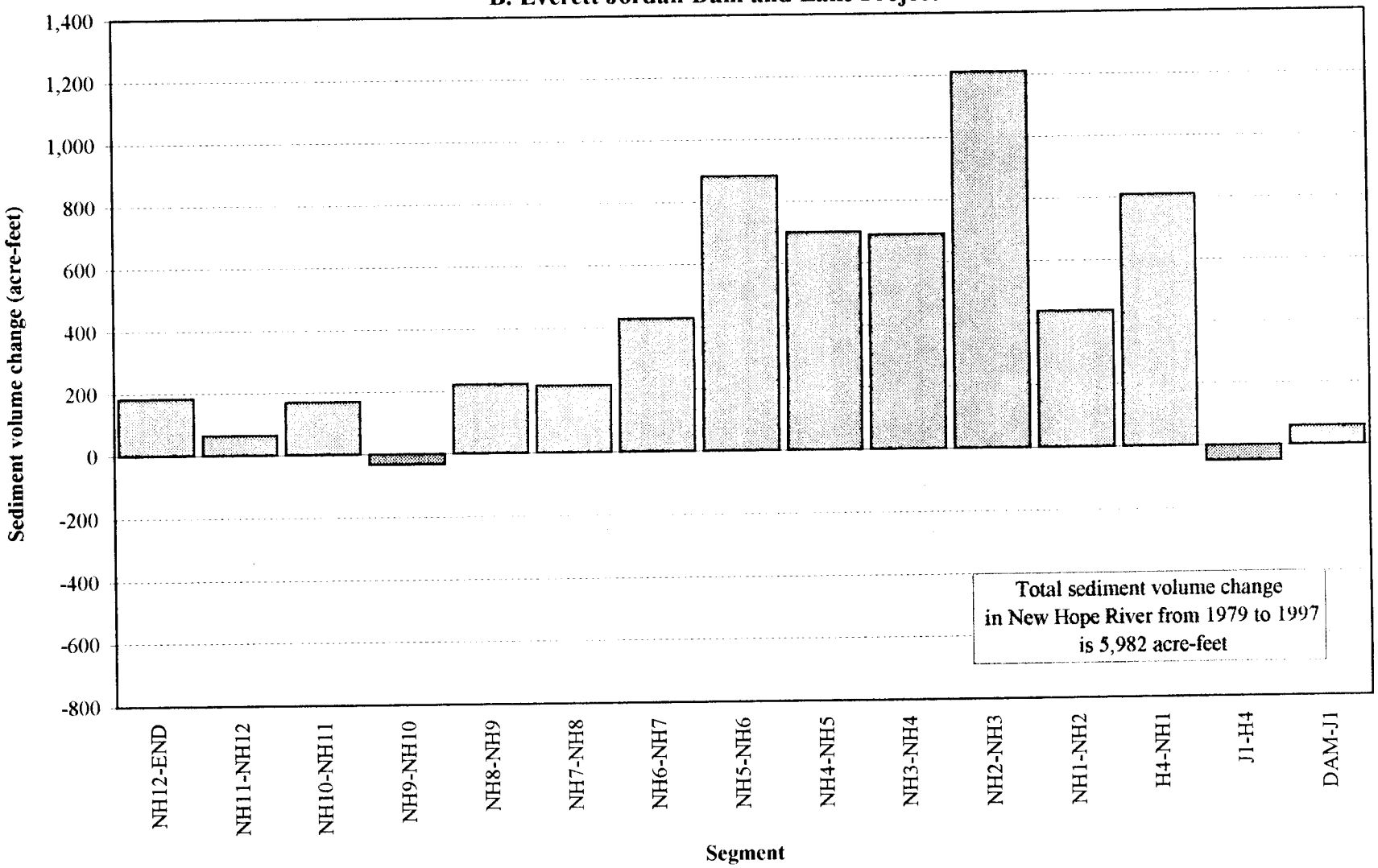


Figure 12

Sediment volume change for New Hope River sedimentation range segments
1990 resurvey to 1997 resurvey
B. Everett Jordan Dam and Lake Project

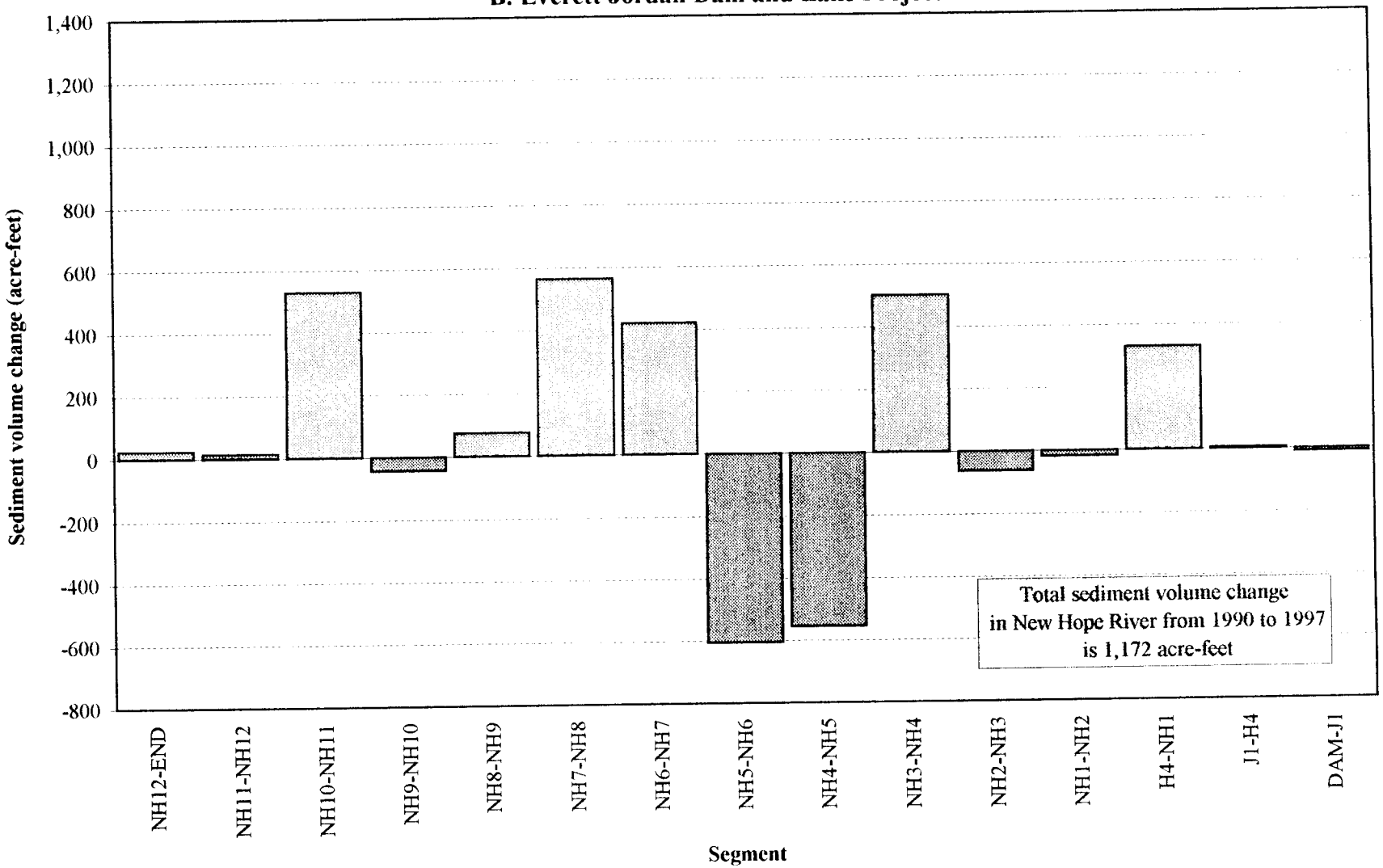


Figure 13

Distribution of sediment volume change for the New Hope River
1979 original survey to 1997 resurvey
B. Everett Jordan Dam and Lake Project

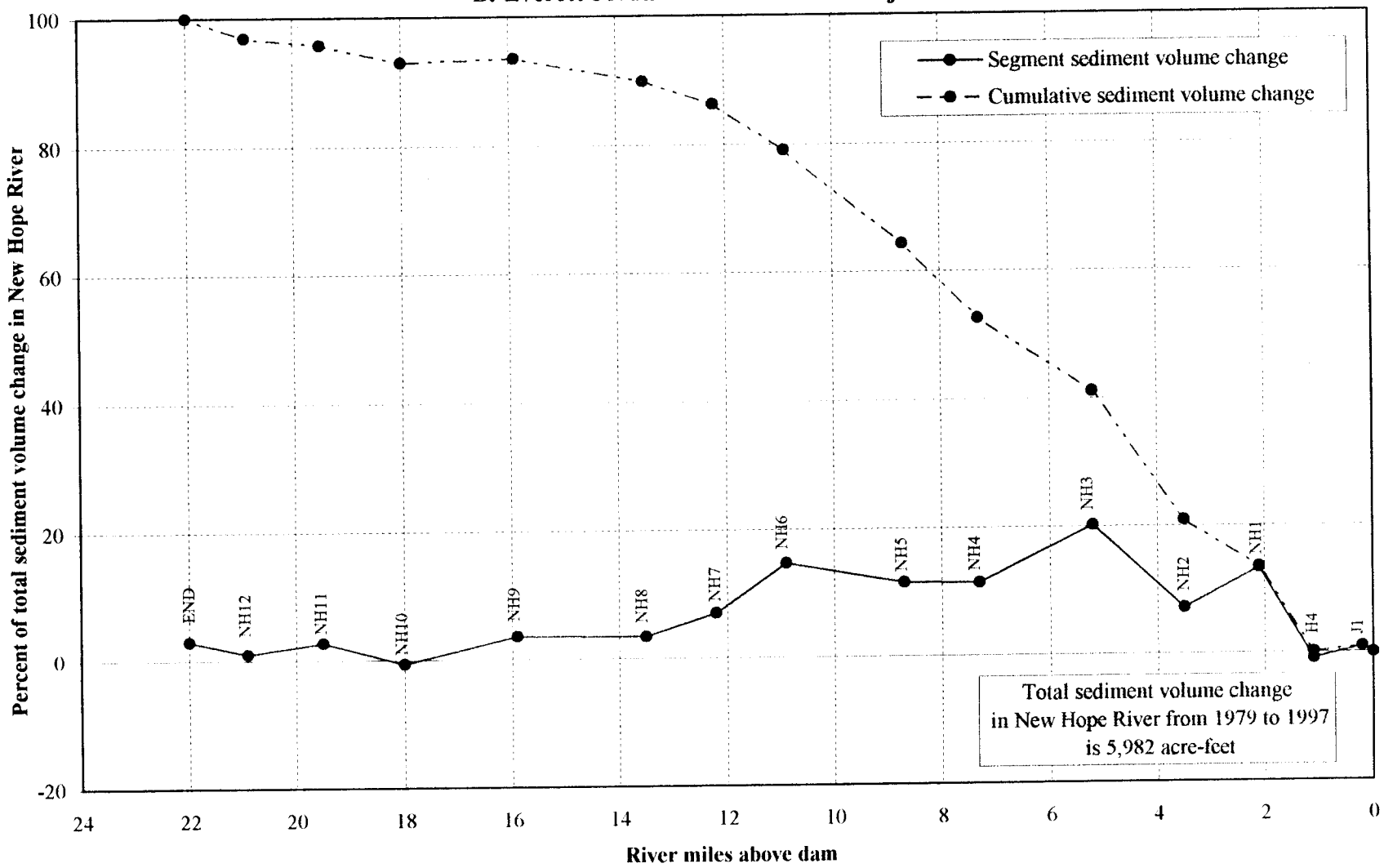


Figure 14

Distribution of sediment volume change for the New Hope River
1990 resurvey to 1997 resurvey
B. Everett Jordan Dam and Lake Project

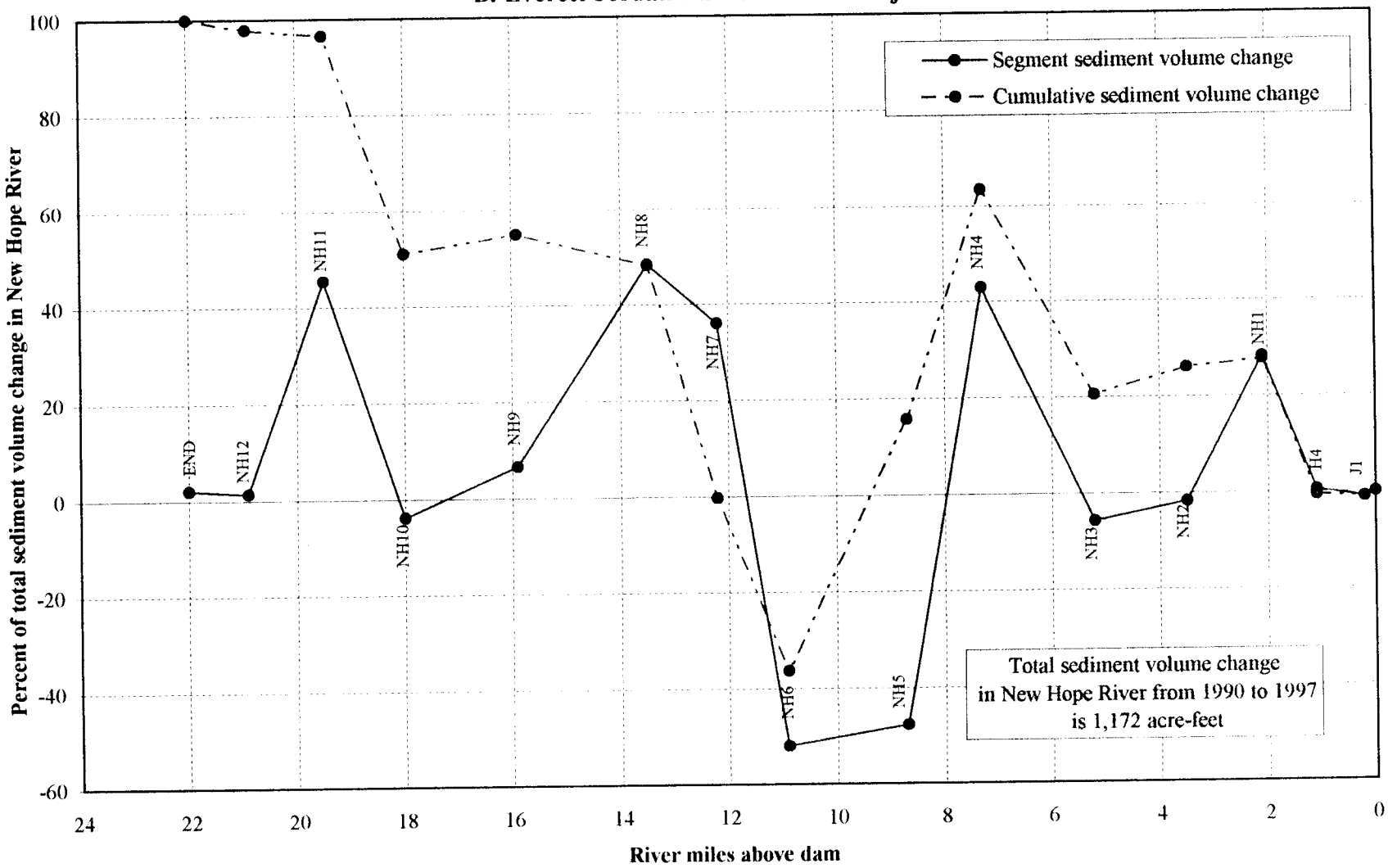


Figure 15

New Hope River sediment volume change from 1979 to 1997
relative to 1979 original survey segment capacity
B. Everett Jordan Dam and Lake Project

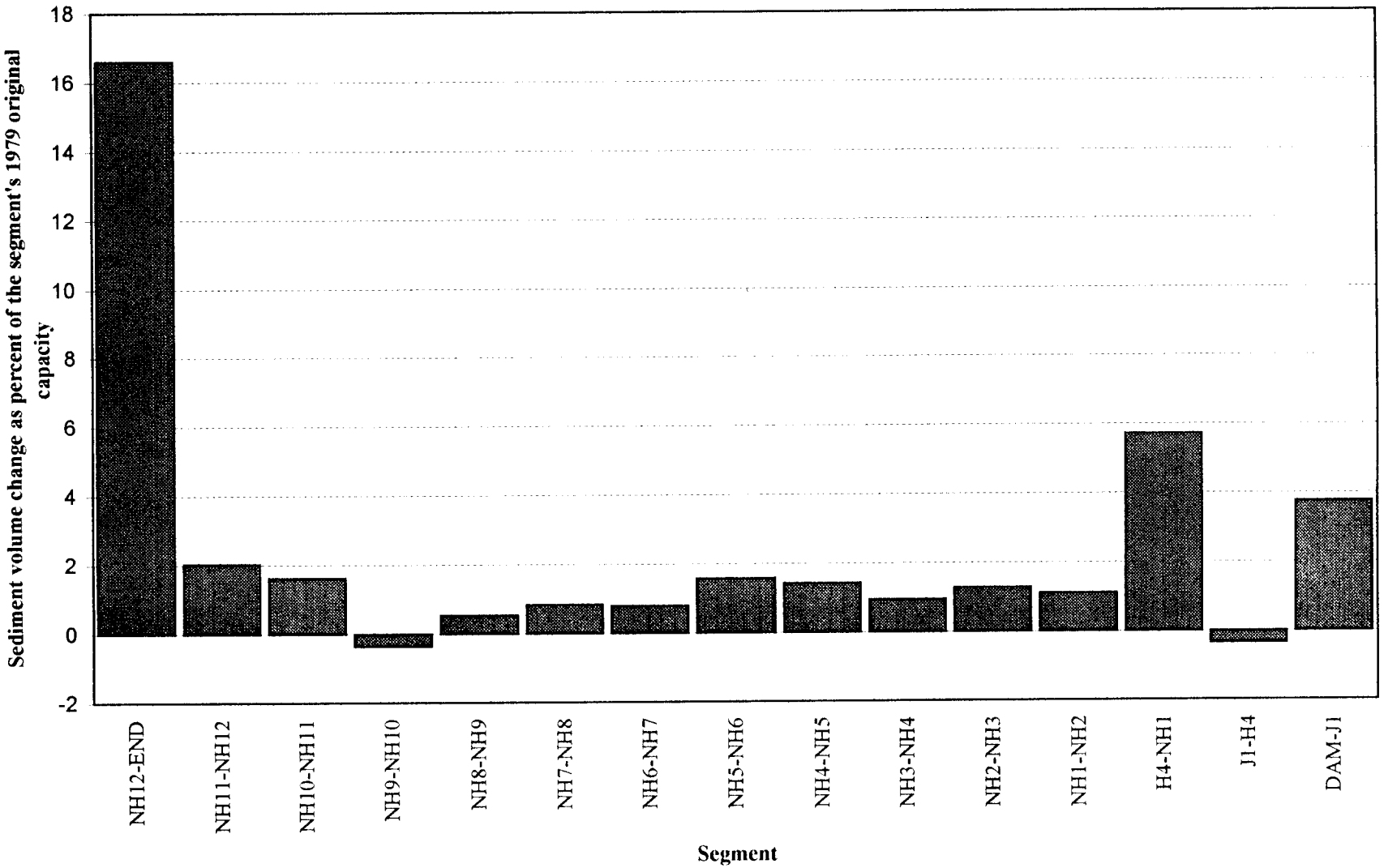


Figure 16

New Hope River sediment volume change from 1990 to 1997
relative to the segment's 1990 resurvey capacity
B. Everett Jordan Dam and Lake Project

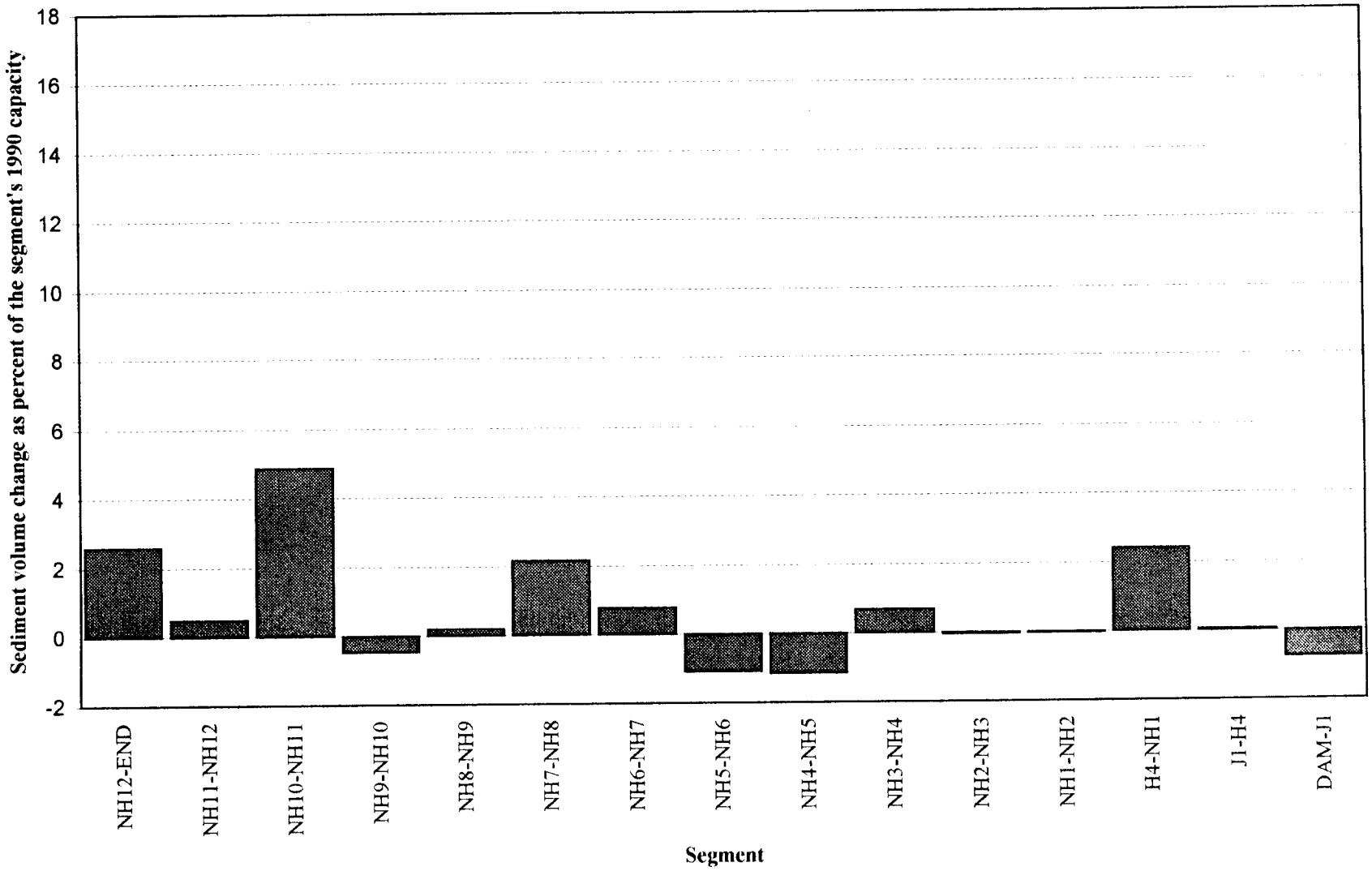


Figure 17

APPENDIX B

TABLES AND ENGINEERING FORM 1787

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
DAM-J1	344	294	243	216	193	156	106	64	9	1,625
J1-H4	2,526	2,387	2,209	1,988	1,754	1,405	895	464	65	13,693
H4AB-H5	6,892	6,299	5,579	4,683	3,388	2,043	813	119	18	29,834
H5-H6	3,136	2,516	1,850	1,162	629	303	20	----	----	9,616
H6-END	739	367	146	8	----	----	----	----	----	1,260
H7-END	560	285	106	3	----	----	----	----	----	954
SUM	14,197	12,148	10,133	8,060	5,964	3,907	1,834	647	92	56,982
K Branch										
K1-K2	4,761	3,871	2,878	2,028	1,419	908	172	----	----	16,037
K2-END	675	321	87	----	----	----	----	----	----	1,083
SUM	5,436	4,192	2,965	2,028	1,419	908	172	----	----	17,120
Stinking Creek										
SK1-SK2	2,842	2,314	1,543	790	257	3	----	----	----	7,749
SK2-END	165	33	----	----	----	----	----	----	----	198
SUM	3,007	2,347	1,543	790	257	3	----	----	----	7,947
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD-NH1	3,448	3,017	2,489	1,910	1,437	1,028	634	188	----	14,151
NH1-NH2	12,245	9,871	7,117	4,908	3,159	1,524	459	36	----	39,319
NH2-NH3	23,131	20,712	17,681	15,147	12,149	5,620	450	----	----	94,890
NH3-NH4	22,089	18,181	14,187	10,514	5,950	1,901	182	----	----	73,004
NH4-NH5	14,100	12,130	10,202	8,150	4,013	484	4	----	----	49,083
NH5-NH6	17,934	14,784	11,722	8,131	3,182	87	----	----	----	55,840
NH6-NH7	17,893	15,730	12,874	6,529	971	1	----	----	----	53,998
NH7-NH8	8,494	7,654	6,561	2,986	14	----	----	----	----	25,709
NH8-NH9	17,649	14,679	8,499	961	----	----	----	----	----	41,788
NH9-NH10	4,858	3,407	833	----	----	----	----	----	----	9,098
NH10-NH11	7,153	3,342	39	----	----	----	----	----	----	10,534
NH11-NH12	3,003	198	----	----	----	----	----	----	----	3,201
NH12-END	1,104	----	----	----	----	----	----	----	----	1,104
SUM	153,101	123,705	92,204	59,236	30,875	10,645	1,729	224	----	471,719
Beaver Creek										
B1-B2	7,980	6,299	4,734	3,200	1,478	213	----	----	----	23,904
B2-B4	7,902	6,019	4,155	2,048	488	1	----	----	----	20,613
B4-B5	6,097	3,448	923	20	----	----	----	----	----	10,488
B5-END	1,185	49	----	----	----	----	----	----	----	1,234
B3-END	1,208	579	165	1	----	----	----	----	----	1,953
SUM	24,372	16,394	9,977	5,269	1,966	214	----	----	----	58,192
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1-END	4,325	2,484	1,235	473	106	1	----	----	----	8,624
Little Beaver Creek										
LB1-LB2	3,779	2,654	1,341	176	----	----	----	----	----	7,950
LB2-END	1,680	546	32	----	----	----	----	----	----	2,258
SUM	5,459	3,200	1,373	176	----	----	----	----	----	10,208
White Oak Creek										
WO1-WO2	10,161	7,980	5,831	3,439	1,129	51	----	----	----	28,591
WO2-WO3	4,908	3,393	1,313	2	----	----	----	----	----	9,616
WO3-WO4	2,502	515	----	----	----	----	----	----	----	3,017
WO4-END	3	----	----	----	----	----	----	----	----	3
SUM	17,574	11,888	7,144	3,441	1,129	51	----	----	----	41,227
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	3,365	2,002	960	258	1	----	----	----	----	6,586
BU2-BU3	1,924	1,134	404	----	----	----	----	----	----	3,462
BU3-END	877	195	----	----	----	----	----	----	----	1,072
SUM	6,166	3,331	1,364	258	1	----	----	----	----	11,120
Cub Run Creek										
CR1-CR2	1,804	744	111	----	----	----	----	----	----	2,659
CR2-END	52	----	----	----	----	----	----	----	----	52
SUM	1,856	744	111	----	----	----	----	----	----	2,711
Morgan Creek										
M1-M2	10,730	7,801	3,526	229	----	----	----	----	----	22,286
M2-M3	3,696	1,099	----	----	----	----	----	----	----	4,795
M3-END	1,041	----	----	----	----	----	----	----	----	1,041
SUM	15,467	8,900	3,526	229	----	----	----	----	----	28,122
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	1,047	436	35	----	----	----	----	----	----	1,518
Indian Creek										
I1-END	1,451	624	137	----	----	----	----	----	----	2,212
Northeast and Burden Creek										
NE1-NE2	8,618	5,601	2,029	112	----	----	----	----	----	16,360
NE2-NE3	4,830	2,155	7	----	----	----	----	----	----	6,992
NE3-BE1	2,250	210	----	----	----	----	----	----	----	2,460
BE1-END	809	----	----	----	----	----	----	----	----	809
SUM	16,507	7,966	2,036	112	----	----	----	----	----	26,621
Panther Creek										
P1-P2	422	93	----	----	----	----	----	----	----	515
P2-END	466	3	----	----	----	----	----	----	----	469
SUM	888	96	----	----	----	----	----	----	----	984
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 1

1979 Original Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1-END	139	----	----	----	----	----	----	----	----	139
Crooked Creek										
C1-END	1,818	927	242	----	----	----	----	----	----	2,987
Little Creek										
L1-L2	2,571	966	----	----	----	----	----	----	----	3,537
L2-L3	1,529	18	----	----	----	----	----	----	----	1,547
L3-END	1	----	----	----	----	----	----	----	----	1
SUM	4,101	984	----	----	----	----	----	----	----	5,085
Third Fork Creek										
TF1-END	39	----	----	----	----	----	----	----	----	39
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
J1	0.431875	0.368385	0.270972	0.240545	0.220021	0.191503	0.116678	0.062079	0.005703	1.907761
H4AB	0.417842	0.368032	0.336894	0.292907	0.229141	0.191933	0.093008	0.020113	----	1.949870
H5	0.246485	0.227932	0.210544	0.192478	0.126188	0.054978	0.004114	----	----	1.062719
H6	0.263305	0.239359	0.093998	0.001119	----	----	----	----	----	0.597781
H7	0.650499	0.432715	0.162496	0.003529	----	----	----	----	----	1.249239
K Branch										
K1	0.748056	0.701196	0.665817	0.643480	0.620691	0.551936	0.074906	----	----	4.006082
K2	0.188399	0.129686	0.049738	----	----	----	----	----	----	0.367823
Stinking Creek										
SK1	1.016407	0.984776	0.951094	0.909150	0.446393	0.040620	----	----	----	4.348440
SK2	0.073677	0.024416	----	----	----	----	----	----	----	0.098093
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD	0.572289	0.451281	0.379379	0.323140	0.273040	0.225086	0.109622	0.023433	0.002018	2.359288
NH1	0.171572	0.145746	0.124526	0.108580	0.092645	0.073699	0.037873	0.005205	----	0.759846
NH2	1.914727	1.524411	1.259027	1.013859	0.696097	0.345310	0.023676	----	----	6.777107
NH3	2.194660	1.915648	1.437103	1.091619	0.869408	0.101562	0.016631	----	----	7.626631
NH4	1.172945	0.997017	0.924101	0.788380	0.536858	0.059557	0.000670	----	----	4.479528
NH5	1.532386	1.452887	1.327034	1.145129	0.510193	0.048446	----	----	----	6.016075
NH6	1.113782	1.052920	0.936400	0.828144	0.130032	0.000176	----	----	----	4.061454
NH7	0.923992	0.762654	0.647730	0.270363	0.004581	----	----	----	----	2.609320
NH8	0.770332	0.665754	0.597563	0.063581	----	----	----	----	----	2.097230
NH9	1.070878	0.966665	0.167117	----	----	----	----	----	----	2.204660
NH10	0.586608	0.089788	0.004030	----	----	----	----	----	----	0.680426
NH11	0.704128	0.013316	----	----	----	----	----	----	----	0.717444
NH12	0.113663	----	----	----	----	----	----	----	----	0.113663
Beaver Creek										
B1	0.555852	0.466669	0.400454	0.314999	0.181025	0.022713	----	----	----	1.941712
B2	0.435273	0.368350	0.306320	0.273337	0.077908	0.000019	----	----	----	1.461207
B4	0.786431	0.712909	0.562988	0.004230	----	----	----	----	----	2.066558
B5	0.422589	0.003760	----	----	----	----	----	----	----	0.426349
B3	0.243693	0.152701	0.085169	0.000059	----	----	----	----	----	0.481622
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1	0.476440	0.348066	0.297785	0.241872	0.062472	----	----	----	----	1.426637
Little Beaver Creek										
LB1	0.523374	0.429623	0.362036	0.093898	----	----	----	----	----	1.408931
LB2	0.646496	0.421574	0.003930	----	----	----	----	----	----	1.072000
White Oak Creek										
WO1	0.941542	0.813154	0.789284	0.669358	0.414701	0.004023	----	----	----	3.632062
WO2	0.287691	0.239929	0.155322	0.014732	----	----	----	----	----	0.697674
WO3	0.405349	0.117938	----	----	----	----	----	----	----	0.523287
WO4	0.000273	----	----	----	----	----	----	----	----	0.000273
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1	0.451496	0.366811	0.233034	0.077629	0.000130	----	----	----	----	1.129100
BU2	0.256805	0.210569	0.154149	----	----	----	----	----	----	0.621523
BU3	0.198543	0.084111	----	----	----	----	----	----	----	0.282654
Cub Run Creek										
CR1	0.315343	0.116970	0.019542	----	----	----	----	----	----	0.451855
CR2	0.043209	----	----	----	----	----	----	----	----	0.043209
Morgan Creek										
M1	1.051279	0.778570	0.570982	0.018070	----	----	----	----	----	2.418901
M2	0.637209	0.305264	----	----	----	----	----	----	----	0.942473
M3	0.406716	----	----	----	----	----	----	----	----	0.406716
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1	0.279490	0.195289	0.050761	----	----	----	----	----	----	0.525540
Indian Creek										
I1	0.217260	0.173379	0.086343	----	----	----	----	----	----	0.476982
Northeast and Burden Creek										
NE1	0.688319	0.587240	0.458250	0.010889	----	----	----	----	----	1.744698
NE2	0.388864	0.283694	0.004156	----	----	----	----	----	----	0.676714
NE3	0.147739	0.006065	----	----	----	----	----	----	----	0.153804
BE1	0.034098	----	----	----	----	----	----	----	----	0.034098
Panther Creek										
P1	0.313343	0.042385	----	----	----	----	----	----	----	0.355728
P2	0.088830	0.000288	----	----	----	----	----	----	----	0.089118
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 2

1979 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1	0.010622	----	----	----	----	----	----	----	----	0.010622
Crooked Creek										
C1	0.239291	0.174642	0.025756	----	----	----	----	----	----	0.439689
Little Creek										
L1	0.378431	0.239707	----	----	----	----	----	----	----	0.618138
L2	0.327344	0.001100	----	----	----	----	----	----	----	0.328444
L3	0.000431	----	----	----	----	----	----	----	----	0.000431
Third Fork Creek										
TF1	0.004099	----	----	----	----	----	----	----	----	0.004099
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
New Hope River									
H4CD-NH1	4,635.27	5,053.37	4,939.42	4,424.16	3,929.61	3,440.60	4,298.45	6,564.70	----
NH1-NH2	5,869.25	5,910.22	5,144.00	4,372.62	4,005.11	3,637.15	7,457.47	6,916.43	----
NH2-NH3	5,628.82	6,020.83	6,557.92	7,194.09	7,760.44	12,576.31	11,164.31	----	----
NH3-NH4	6,559.26	6,242.05	6,008.38	5,592.56	4,231.06	11,798.73	10,519.62	----	----
NH4-NH5	5,211.93	4,951.21	4,531.94	4,215.13	3,832.67	4,481.36	5,970.15	----	----
NH5-NH6	6,777.35	5,899.90	5,178.86	4,120.57	4,970.13	1,789.31	----	----	----
NH6-NH7	8,780.66	8,663.93	8,126.86	5,943.52	7,213.27	5,681.82	----	----	----
NH7-NH8	5,013.21	5,358.41	5,268.64	8,941.62	3,056.10	----	----	----	----
NH8-NH9	9,585.54	8,992.18	11,114.45	15,114.58	----	----	----	----	----
NH9-NH10	2,930.94	3,224.94	4,867.16	----	----	----	----	----	----
NH10-NH11	5,541.80	32,413.87	9,677.42	----	----	----	----	----	----
NH11-NH12	3,672.09	14,869.33	----	----	----	----	----	----	----
NH12-END	9,712.92	----	----	----	----	----	----	----	----
Beaver Creek									
B1-B2	8,051.46	7,543.54	6,698.04	5,439.07	5,708.04	9,370.05	----	----	----
B2-B4	6,468.02	5,566.66	4,779.66	7,378.40	6,263.80	52,631.58	----	----	----
B4-B5	5,042.93	4,811.15	1,639.47	4,728.13	----	----	----	----	----
B5-END	2,804.14	13,031.91	----	----	----	----	----	----	----
B3-END	4,957.06	3,791.72	1,937.32	16,949.15	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
Haw River									
DAM-J1	796.53	798.08	896.77	897.96	877.19	814.61	908.48	1,030.94	1,578.12
J1-H4	2,972.75	3,241.37	3,634.02	3,726.67	3,905.05	3,664.24	4,268.29	5,645.32	11,397.51
H4AB-H5	10,374.41	10,569.43	10,191.11	9,648.01	9,534.83	8,274.24	8,370.91	5,916.57	----
H5-H6	6,151.55	5,384.23	6,074.70	6,002.16	4,984.63	5,511.30	4,861.45	----	----
H6-END	2,806.63	1,533.26	1,553.22	7,149.24	----	----	----	----	----
H7-END	860.88	658.63	652.32	850.10	----	----	----	----	----
K Branch									
K1-K2	5,084.07	4,658.90	4,022.05	3,151.61	2,286.16	1,645.12	2,296.21	----	----
K2-END	3,582.82	2,475.21	1,749.17	----	----	----	----	----	----
Stinking Creek									
SK1-SK2	2,607.14	2,292.92	1,622.34	868.94	575.73	73.86	----	----	----
SK2-END	2,239.50	1,351.57	----	----	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
Weaver Creek									
W1-END	9,077.74	7,136.57	4,147.28	1,955.58	1,696.75	----	----	----	----
Little Beaver Creek									
LB1-LB2	3,230.27	3,117.96	3,664.27	1,874.37	----	----	----	----	----
LB2-END	2,598.62	1,295.15	8,142.49	----	----	----	----	----	----
White Oak Creek									
WO1-WO2	8,266.13	7,577.75	6,172.94	5,027.12	2,722.44	12,677.11	----	----	----
WO2-WO3	7,081.84	9,481.18	8,453.41	135.76	----	----	----	----	----
WO3-WO4	6,168.30	4,366.70	----	----	----	----	----	----	----
WO4-END	10,989.01	----	----	----	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
Bush Creek									
BU1-BU2	4,750.81	3,467.39	2,479.45	3,323.50	7,692.31	----	----	----	----
BU2-BU3	4,225.34	3,848.24	2,620.84	----	----	----	----	----	----
BU3-END	4,417.18	2,318.37	----	----	----	----	----	----	----
Cub Run Creek									
CR1-CR2	5,031.35	6,360.61	5,680.07	----	----	----	----	----	----
CR2-END	1,203.45	----	----	----	----	----	----	----	----
Morgan Creek									
M1-M2	6,354.80	7,197.60	6,175.33	12,672.94	----	----	----	----	----
M2-M3	3,540.48	3,600.16	----	----	----	----	----	----	----
M3-END	2,559.53	----	----	----	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
Lick Branch									
LK1-END	3,746.11	2,232.59	689.51	----	----	----	----	----	----
Indian Creek									
I1-END	6,678.63	3,599.05	1,586.69	----	----	----	----	----	----
Northeast and Burden Creek									
NE1-NE2	8,000.50	6,431.03	4,387.92	10,285.61	----	----	----	----	----
NE2-NE3	9,001.07	7,437.22	1,684.31	----	----	----	----	----	----
NE3-BE1	12,373.72	34,624.90	----	----	----	----	----	----	----
BE1-END	23,725.73	----	----	----	----	----	----	----	----
Panther Creek									
P1-P2	1,049.30	2,179.36	----	----	----	----	----	----	----
P2-END	5,245.98	10,416.67	----	----	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 3

Effective Lengths (feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150
Kit Creek									
KT1-END	13,086.05	----	----	----	----	----	----	----	----
Crooked Creek									
C1-END	7,597.44	5,308.00	9,395.87	----	----	----	----	----	----
Little Creek									
L1-L2	3,642.80	4,011.51	----	----	----	----	----	----	----
L2-L3	4,664.79	16,363.64	----	----	----	----	----	----	----
L3-END	2,320.19	----	----	----	----	----	----	----	----
Third Fork Creek									
TF1-END	9,514.52	----	----	----	----	----	----	----	----
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150

Table 4

1990 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	**240-230**	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**
Haw River										
DAM-J1	340	290	241	206	184	149	90	50	1	1,552
J1-H4	2,600	2,427	2,260	2,005	1,774	1,437	803	441	4	13,750
H4AB-H5	7,197	6,479	5,740	4,762	3,245	1,901	748	174	----	30,247
H5-H6	3,142	2,514	1,818	1,121	478	117	----	----	----	9,190
H6-END	742	366	139	9	----	----	----	----	----	1,256
H7-END	562	288	111	7	----	----	----	----	----	967
SUM	14,583	12,364	10,309	8,110	5,682	3,603	1,640	666	4	56,962
K Branch										
K1-K2	4,757	3,853	2,929	2,012	1,407	844	123	----	----	15,925
K2-END	678	321	103	----	----	----	----	----	----	1,101
SUM	5,434	4,173	3,032	2,012	1,407	844	123	----	----	17,026
Stinking Creek										
SK1-SK2	2,871	2,310	1,555	789	270	2	----	----	----	7,797
SK2-END	162	28	----	----	----	----	----	----	----	190
SUM	3,034	2,338	1,555	789	270	2	----	----	----	7,988
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 4

1990 Capacities (acre-feet)

Segment	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
	Elevation Interval (feet MSL)									
New Hope River										
H4CD-NH1	3,377	2,951	2,408	1,833	1,377	979	585	160	----	13,671
NH1-NH2	12,258	9,658	7,085	4,917	3,083	1,426	396	39	----	38,863
NH2-NH3	23,143	20,480	17,868	15,389	11,704	4,758	274	----	----	93,615
NH3-NH4	22,107	18,194	14,360	10,619	5,758	1,663	114	----	----	72,815
NH4-NH5	14,083	12,048	9,992	7,830	3,508	362	4	----	----	47,827
NH5-NH6	17,893	14,672	11,556	7,877	2,345	6	----	----	----	54,349
NH6-NH7	17,884	15,755	12,991	6,748	612	----	----	----	----	53,991
NH7-NH8	8,485	7,639	6,637	3,294	4	----	----	----	----	26,059
NH8-NH9	17,625	14,643	8,470	904	----	----	----	----	----	41,642
NH9-NH10	4,858	3,439	792	----	----	----	----	----	----	9,089
NH10-NH11	7,114	3,740	39	----	----	----	----	----	----	10,893
NH11-NH12	2,912	239	----	----	----	----	----	----	----	3,152
NH12-END	945	----	----	----	----	----	----	----	----	945
SUM	152,684	123,458	92,199	59,411	28,392	9,193	1,374	199	----	466,909
Beaver Creek										
B1-B2	7,983	6,310	4,761	3,196	1,451	166	----	----	----	23,868
B2-B4	7,905	6,019	4,053	2,020	477	----	----	----	----	20,473
B4-B5	6,082	3,441	880	5	----	----	----	----	----	10,409
B5-END	1,173	41	----	----	----	----	----	----	----	1,214
B3-END	1,193	577	159	----	----	----	----	----	----	1,929
SUM	24,337	16,388	9,853	5,221	1,928	166	----	----	----	57,894
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 4

1990 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	**240-230**	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**
Weaver Creek										
W1-END	4,325	2,484	1,235	473	106	----	----	----	----	8,623
Little Beaver Creek										
LB1-LB2	3,779	2,639	1,316	180	----	----	----	----	----	7,913
LB2-END	1,677	542	19	----	----	----	----	----	----	2,238
SUM	5,456	3,180	1,335	180	----	----	----	----	----	10,151
White Oak Creek										
WO1-WO2	10,299	7,894	5,816	3,899	1,192	28	----	----	----	29,129
WO2-WO3	4,918	3,300	1,373	2	----	----	----	----	----	9,593
WO3-WO4	2,519	488	----	----	----	----	----	----	----	3,008
WO4-END	5	----	----	----	----	----	----	----	----	5
SUM	17,742	11,682	7,189	3,901	1,192	28	----	----	----	41,735
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 4

1990 Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	3,319	1,981	949	251	----	----	----	----	----	6,500
BU2-BU3	1,891	1,114	399	----	----	----	----	----	----	3,404
BU3-END	879	195	----	----	----	----	----	----	----	1,074
SUM	6,089	3,290	1,348	251	----	----	----	----	----	10,978
Cub Run Creek										
CR1-CR2	1,894	826	150	----	----	----	----	----	----	2,869
CR2-END	46	----	----	----	----	----	----	----	----	46
SUM	1,939	826	150	----	----	----	----	----	----	2,915
Morgan Creek										
M1-M2	10,708	7,674	3,541	242	----	----	----	----	----	22,165
M2-M3	3,616	1,075	----	----	----	----	----	----	----	4,692
M3-END	973	----	----	----	----	----	----	----	----	973
SUM	15,298	8,749	3,541	242	----	----	----	----	----	27,830
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 4

1990 Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	1,035	426	37	----	----	----	----	----	----	1,497
Indian Creek										
I1-END	1,454	624	142	----	----	----	----	----	----	2,221
Northeast and Burden Creek										
NE1-NE2	8,610	5,549	2,011	20	----	----	----	----	----	16,189
NE2-NE3	4,690	2,128	8	----	----	----	----	----	----	6,827
NE3-BE1	1,725	249	----	----	----	----	----	----	----	1,974
BE1-END	184	----	----	----	----	----	----	----	----	184
SUM	15,208	7,926	2,019	20	----	----	----	----	----	25,173
Panther Creek										
P1-P2	423	97	----	----	----	----	----	----	----	520
P2-END	458	6	----	----	----	----	----	----	----	464
SUM	881	103	----	----	----	----	----	----	----	984
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 4

1990 Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1-END	134	----	----	----	----	----	----	----	----	134
Crooked Creek										
C1-END	1,822	929	246	----	----	----	----	----	----	2,997
Little Creek										
L1-L2	2,577	950	----	----	----	----	----	----	----	3,527
L2-L3	1,531	20	----	----	----	----	----	----	----	1,551
L3-END	1	----	----	----	----	----	----	----	----	1
SUM	4,110	969	----	----	----	----	----	----	----	5,079
Third Fork Creek										
TF1-END	51	----	----	----	----	----	----	----	----	51
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
J1	0.427406	0.363698	0.268328	0.229902	0.209847	0.183466	0.098748	0.048631	0.000341	1.830367
H4AB	0.447168	0.384931	0.353626	0.308048	0.244540	0.208572	0.089327	0.029484	----	2.065696
H5	0.246557	0.228043	0.209640	0.185561	0.095843	0.021158	----	----	----	0.986802
H6	0.264234	0.238968	0.089619	0.001219	----	----	----	----	----	0.594040
H7	0.652965	0.436846	0.169649	0.007997	----	----	----	----	----	1.267457
K Branch										
K1	0.746339	0.697344	0.669554	0.638539	0.615597	0.513016	0.053508	0.000341	----	3.934238
K2	0.189233	0.129581	0.058688	----	----	----	----	----	----	0.377502
Stinking Creek										
SK1	1.028849	0.986834	0.958565	0.907702	0.469314	0.023185	----	----	----	4.374449
SK2	0.072489	0.020756	----	----	----	----	----	----	----	0.093245
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD	0.556619	0.437692	0.360411	0.302720	0.254899	0.207396	0.097542	0.018699	----	2.235978
NH1	0.171871	0.146283	0.127172	0.111570	0.095643	0.077072	0.038606	0.005683	----	0.773900
NH2	1.916644	1.487830	1.250196	1.013008	0.674040	0.315008	0.014491	----	----	6.671217
NH3	2.194806	1.913648	1.474384	1.126079	0.834155	0.063319	0.010083	----	----	7.616474
NH4	1.175541	1.001043	0.915640	0.772671	0.526790	0.077608	0.000744	----	----	4.470037
NH5	1.526517	1.432222	1.289108	1.084990	0.388480	0.003091	----	----	----	5.724408
NH6	1.113611	1.054651	0.942190	0.826694	0.083391	----	----	----	----	4.020537
NH7	0.923148	0.763848	0.656389	0.308605	0.001460	----	----	----	----	2.653450
NH8	0.769349	0.661765	0.603330	0.059785	----	----	----	----	----	2.094229
NH9	1.069361	0.966674	0.158745	----	----	----	----	----	----	2.194780
NH10	0.587987	0.099693	0.004050	----	----	----	----	----	----	0.691730
NH11	0.695800	0.015680	----	----	----	----	----	----	----	0.711480
NH12	0.097294	0.000417	----	----	----	----	----	----	----	0.097711
Beaver Creek										
B1	0.557094	0.467396	0.399923	0.314960	0.178159	0.017738	----	----	----	1.935270
B2	0.434428	0.369128	0.310938	0.272613	0.076123	----	----	----	----	1.463230
B4	0.787678	0.712077	0.536988	0.001158	----	----	----	----	----	2.037901
B5	0.418449	0.003133	----	----	----	----	----	----	----	0.421582
B3	0.240662	0.152140	0.082040	----	----	----	----	----	----	0.474842
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1	0.476440	0.348066	0.297785	0.241872	0.062472	----	----	----	----	1.426637
Little Beaver Creek										
LB1	0.524218	0.427941	0.356865	0.095793	----	----	----	----	----	1.404817
LB2	0.645501	0.418327	0.002344	----	----	----	----	----	----	1.066172
White Oak Creek										
WO1	0.959437	0.805477	0.779836	0.761421	0.438011	0.002203	----	----	----	3.746385
WO2	0.286526	0.236213	0.162402	0.014145	----	----	----	----	----	0.699286
WO3	0.407959	0.111835	----	----	----	----	----	----	----	0.519794
WO4	0.000492	----	----	----	----	----	----	----	----	0.000492
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1	0.450115	0.366269	0.230368	0.075460	----	----	----	----	----	1.122212
BU2	0.248562	0.205088	0.152243	----	----	----	----	----	----	0.605893
BU3	0.198950	0.084312	----	----	----	----	----	----	----	0.283262
Cub Run Creek										
CR1	0.338458	0.129808	0.026356	----	----	----	----	----	----	0.494622
CR2	0.037911	----	----	----	----	----	----	----	----	0.037911
Morgan Creek										
M1	1.043818	0.767432	0.572972	0.019133	----	----	----	----	----	2.403355
M2	0.641260	0.298734	0.000397	----	----	----	----	----	----	0.940391
M3	0.380166	----	----	----	----	----	----	----	----	0.380166
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1	0.276198	0.190697	0.053065	----	----	----	----	----	----	0.519960
Indian Creek										
I1	0.217783	0.173441	0.089675	----	----	----	----	----	----	0.480899
Northeast and Burden Creek										
NE1	0.686668	0.583802	0.453493	0.001930	----	----	----	----	----	1.725893
NE2	0.389454	0.279004	0.004771	----	----	----	----	----	----	0.673229
NE3	0.131646	0.007191	----	----	----	----	----	----	----	0.138837
BE1	0.007737	----	----	----	----	----	----	----	----	0.007737
Panther Creek										
P1	0.315769	0.043854	----	----	----	----	----	----	----	0.359623
P2	0.087294	0.000581	----	----	----	----	----	----	----	0.087875
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 5

1990 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1	0.010204	----	----	----	----	----	----	----	----	0.010204
Crooked Creek										
C1	0.239845	0.175102	0.026152	----	----	----	----	----	----	0.441099
Little Creek										
L1	0.379763	0.235531	0.000619	----	----	----	----	----	----	0.615913
L2	0.327688	0.001198	----	----	----	----	----	----	----	0.328886
L3	0.000563	----	----	----	----	----	----	----	----	0.000563
Third Fork Creek										
TF1	0.005385	----	----	----	----	----	----	----	----	0.005385
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 6

1997 Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
DAM-J1	340	289	243	212	189	152	94	45	----	1,564
J1-H4	2,631	2,438	2,269	2,042	1,804	1,434	790	337	----	13,744
H4AB-H5	7,317	6,554	5,776	4,751	2,988	1,691	680	93	----	29,850
H5-H6	3,145	2,515	1,833	1,095	332	----	----	----	----	8,919
H6-END	741	364	138	11	----	----	----	----	----	1,255
H7-END	563	288	113	6	----	----	----	----	----	970
SUM	14,738	12,447	10,372	8,117	5,312	3,278	1,564	475	----	56,303
K Branch										
K1-K2	4,773	3,873	2,915	2,033	1,422	835	92	----	----	15,943
K2-END	678	323	90	----	----	----	----	----	----	1,091
SUM	5,451	4,197	3,004	2,033	1,422	835	92	----	----	17,034
Stinking Creek										
SK1-SK2	2,874	2,310	1,554	791	203	1	----	----	----	7,733
SK2-END	164	29	----	----	----	----	----	----	----	193
SUM	3,037	2,339	1,554	791	203	1	----	----	----	7,926
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 6

1997 Capacities (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD-NH1	3,180	2,913	2,427	1,838	1,374	965	522	121	----	13,341
NH1-NH2	12,238	9,673	7,110	4,923	3,123	1,424	366	25	----	38,882
NH2-NH3	23,115	20,494	17,656	15,114	12,054	5,010	236	----	----	93,680
NH3-NH4	22,107	18,155	14,162	10,442	5,935	1,413	100	----	----	72,314
NH4-NH5	14,087	12,016	10,157	8,054	3,805	266	----	----	----	48,383
NH5-NH6	17,888	14,664	11,737	8,064	2,565	38	----	----	----	54,955
NH6-NH7	17,900	15,757	12,991	6,504	419	----	----	----	----	53,570
NH7-NH8	8,496	7,661	6,622	2,714	----	----	----	----	----	25,494
NH8-NH9	17,638	14,686	8,666	575	----	----	----	----	----	41,565
NH9-NH10	4,871	3,387	875	----	----	----	----	----	----	9,133
NH10-NH11	7,095	3,233	36	----	----	----	----	----	----	10,363
NH11-NH12	2,878	258	----	----	----	----	----	----	----	3,136
NH12-END	921	----	----	----	----	----	----	----	----	921
SUM	152,413	122,898	92,438	58,228	29,275	9,115	1,224	146	----	465,737
Beaver Creek										
B1-B2	8,079	6,444	4,781	3,241	1,438	158	----	----	----	24,140
B2-B4	7,932	6,041	4,269	2,104	458	----	----	----	----	20,805
B4-B5	6,116	3,463	951	44	----	----	----	----	----	10,575
B5-END	1,183	28	----	----	----	----	----	----	----	1,211
B3-END	1,219	578	173	----	----	----	----	----	----	1,971
SUM	24,530	16,555	10,175	5,389	1,896	158	----	----	----	58,702
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 6

1997 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	**240-230**	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**
Weaver Creek										
W1-END	4,329	2,494	1,249	477	111	----	----	----	----	8,660
Little Beaver Creek										
LB1-LB2	3,782	2,637	1,324	173	----	----	----	----	----	7,915
LB2-END	1,684	543	18	----	----	----	----	----	----	2,245
SUM	5,466	3,179	1,342	173	----	----	----	----	----	10,160
White Oak Creek										
WO1-WO2	10,314	7,920	5,818	3,958	1,257	19	----	----	----	29,285
WO2-WO3	4,928	3,372	1,360	3	----	----	----	----	----	9,663
WO3-WO4	2,535	516	----	----	----	----	----	----	----	3,051
WO4-END	11	----	----	----	----	----	----	----	----	11
SUM	17,789	11,807	7,178	3,960	1,257	19	----	----	----	42,010
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 6

1997 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	3,356	2,003	970	249	----	----	----	----	----	6,578
BU2-BU3	1,913	1,146	404	----	----	----	----	----	----	3,463
BU3-END	878	204	----	----	----	----	----	----	----	1,082
SUM	6,147	3,352	1,373	249	----	----	----	----	----	11,122
Cub Run Creek										
CR1-CR2	1,767	755	132	----	----	----	----	----	----	2,654
CR2-END	44	----	----	----	----	----	----	----	----	44
SUM	1,811	755	132	----	----	----	----	----	----	2,698
Morgan Creek										
M1-M2	10,762	7,865	3,583	192	----	----	----	----	----	22,402
M2-M3	3,637	1,148	----	----	----	----	----	----	----	4,785
M3-END	980	----	----	----	----	----	----	----	----	980
SUM	15,378	9,013	3,583	192	----	----	----	----	----	28,167
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 6

1997 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	1,047	434	37	----	----	----	----	----	----	1,518
Indian Creek										
I1-END	1,458	624	141	----	----	----	----	----	----	2,223
Northeast and Burden Creek										
NE1-NE2	8,612	5,576	2,075	4	----	----	----	----	----	16,268
NE2-NE3	4,609	2,176	9	----	----	----	----	----	----	6,794
NE3-BE1	1,648	344	----	----	----	----	----	----	----	1,992
BE1-END	260	----	----	----	----	----	----	----	----	260
SUM	15,129	8,096	2,084	4	----	----	----	----	----	25,314
Panther Creek										
P1-P2	426	101	----	----	----	----	----	----	----	528
P2-END	461	12	----	----	----	----	----	----	----	473
SUM	888	113	----	----	----	----	----	----	----	1,001
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 6

1997 Capacities (acre-feet)										
	Elevation Interval (feet MSL)									
Segment	**240-230**	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**
Kit Creek										
KT1-END	130	----	----	----	----	----	----	----	----	130
Crooked Creek										
C1-END	1,856	932	217	----	----	----	----	----	----	3,005
Little Creek										
L1-L2	2,564	946	----	----	----	----	----	----	----	3,511
L2-L3	1,514	16	----	----	----	----	----	----	----	1,530
L3-END	2	----	----	----	----	----	----	----	----	2
SUM	4,080	962	----	----	----	----	----	----	----	5,042
Third Fork Creek										
TF1-END	85	----	----	----	----	----	----	----	----	85
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
J1	0.426825	0.361549	0.270693	0.236132	0.214998	0.186959	0.103822	0.044024	----	1.845002
H4AB	0.458230	0.390648	0.353670	0.311688	0.246858	0.204393	0.081200	0.015674	----	2.062361
H5	0.247105	0.229395	0.213113	0.180747	0.066544	----	----	----	----	0.936903
H6	0.264166	0.237622	0.088693	0.001606	----	----	----	----	----	0.592086
H7	0.654556	0.437441	0.172529	0.007456	----	----	----	----	----	1.271982
K Branch										
K1	0.749396	0.700802	0.673450	0.645205	0.621869	0.507591	0.040226	----	----	3.938540
K2	0.189338	0.130594	0.051209	----	----	----	----	----	----	0.371141
Stinking Creek										
SK1	1.029079	0.985563	0.958048	0.910826	0.352671	0.007893	----	----	----	4.244079
SK2	0.073121	0.021742	----	----	----	----	----	----	----	0.094863
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD	0.513939	0.430965	0.364725	0.305645	0.254989	0.205584	0.084105	0.014865	----	2.174816
NH1	0.172185	0.145552	0.126729	0.109790	0.094557	0.074824	0.037350	0.003597	----	0.764583
NH2	1.912927	1.491099	1.255491	1.016087	0.685304	0.316673	0.011674	----	----	6.689255
NH3	2.193656	1.912781	1.436869	1.084791	0.868010	0.081678	0.009502	----	----	7.587286
NH4	1.176715	0.995702	0.920110	0.782409	0.534620	0.038093	----	----	----	4.447648
NH5	1.526062	1.431148	1.321039	1.128247	0.458076	0.021154	----	----	----	5.885725
NH6	1.113291	1.054238	0.945285	0.828747	0.058082	----	----	----	----	3.999642
NH7	0.925231	0.764413	0.653215	0.265524	----	----	----	----	----	2.608383
NH8	0.769506	0.665385	0.603678	0.038056	----	----	----	----	----	2.076626
NH9	1.070542	0.967824	0.176025	----	----	----	----	----	----	2.214391
NH10	0.591367	0.082578	0.003680	----	----	----	----	----	----	0.677625
NH11	0.688862	0.017156	----	----	----	----	----	----	----	0.706018
NH12	0.094778	0.000224	----	----	----	----	----	----	----	0.095002
Beaver Creek										
B1	0.567841	0.486601	0.400910	0.319955	0.178873	0.016847	----	----	----	1.971026
B2	0.435535	0.367614	0.312879	0.275869	0.073128	----	----	----	----	1.465026
B4	0.790867	0.717673	0.580275	0.009304	----	----	----	----	----	2.098119
B5	0.421905	0.002167	----	----	----	----	----	----	----	0.424071
B3	0.246013	0.152387	0.089529	----	----	----	----	----	----	0.487930
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1	0.476852	0.349487	0.301168	0.244026	0.065212	----	----	----	----	1.436744
Little Beaver Creek										
LB1	0.522552	0.426632	0.359098	0.092310	----	----	----	----	----	1.400592
LB2	0.648174	0.418954	0.002212	----	----	----	----	----	----	1.069340
White Oak Creek										
WO1	0.961826	0.807564	0.781630	0.767725	0.461580	0.001513	----	----	----	3.781837
WO2	0.285941	0.237557	0.160863	0.019558	----	----	----	----	----	0.703919
WO3	0.409994	0.118089	----	----	----	----	----	----	----	0.528082
WO4	0.000985	----	----	----	----	----	----	----	----	0.000985
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1	0.452330	0.367699	0.237228	0.075006	----	----	----	----	----	1.132264
BU2	0.254037	0.209886	0.153946	----	----	----	----	----	----	0.617868
BU3	0.198815	0.087873	0.000029	----	----	----	----	----	----	0.286717
Cub Run Creek										
CR1	0.314975	0.118751	0.023188	----	----	----	----	----	----	0.456914
CR2	0.036292	----	----	----	----	----	----	----	----	0.036292
Morgan Creek										
M1	1.049074	0.774086	0.578548	0.015164	----	----	----	----	----	2.416873
M2	0.644373	0.318682	0.001717	----	----	----	----	----	----	0.964773
M3	0.382827	0.000184	----	----	----	----	----	----	----	0.383011
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1	0.279504	0.194457	0.053354	----	----	----	----	----	----	0.527315
Indian Creek										
I1	0.218368	0.173458	0.088591	----	----	----	----	----	----	0.480417
Northeast and Burden Creek										
NE1	0.686677	0.584408	0.467410	0.000423	----	----	----	----	----	1.738917
NE2	0.389802	0.282688	0.005384	----	----	----	----	----	----	0.677873
NE3	0.122221	0.009931	----	----	----	----	----	----	----	0.132152
BE1	0.010966	----	----	----	----	----	----	----	----	0.010966
Panther Creek										
P1	0.318310	0.045349	----	----	----	----	----	----	----	0.363660
P2	0.087970	0.001119	----	----	----	----	----	----	----	0.089088
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 7

1997 End Areas of Ranges (acres)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1	0.009917	----	----	----	----	----	----	----	----	0.009917
Crooked Creek										
C1	0.244327	0.175545	0.023102	----	----	----	----	----	----	0.442973
Little Creek										
L1	0.380149	0.234927	----	----	----	----	----	----	----	0.615076
L2	0.323828	0.000949	----	----	----	----	----	----	----	0.324777
L3	0.000778	----	----	----	----	----	----	----	----	0.000778
Third Fork Creek										
TF1	0.008887	----	----	----	----	----	----	----	----	0.008887
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
DAM-J1	4	4	2	10	9	7	16	14	8	73
J1-H4	-74	-40	-51	-17	-20	-32	92	23	61	-57
H4AB-H5	-305	-180	-161	-79	143	142	65	-55	18	-413
H5-H6	-6	2	32	41	151	186	20	----	----	426
H6-END	-3	1	7	-1	----	----	----	----	----	4
H7-END	-2	-3	-5	-4	----	----	----	----	----	-13
SUM	-386	-216	-176	-50	282	304	194	-19	88	20
K Branch										
K1-K2	4	18	-51	16	12	64	49	----	----	112
K2-END	-3	>1	-16	----	----	----	----	----	----	-18
SUM	2	19	-67	16	12	64	49	----	----	94
Stinking Creek										
SK1-SK2	-29	4	-12	1	-13	1	----	----	----	-48
SK2-END	3	5	----	----	----	----	----	----	----	8
SUM	-27	9	-12	1	-13	1	----	----	----	-41
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD-NH1	71	66	81	77	60	49	49	28	----	480
NH1-NH2	-13	213	32	-9	76	98	63	-3	----	456
NH2-NH3	-12	232	-187	-242	445	862	176	----	----	1,275
NH3-NH4	-18	-13	-173	-105	192	238	68	----	----	189
NH4-NH5	17	82	210	320	505	122	>1	----	----	1,256
NH5-NH6	41	112	166	254	837	81	----	----	----	1,491
NH6-NH7	9	-25	-117	-219	359	1	----	----	----	7
NH7-NH8	9	15	-76	-308	10	----	----	----	----	-350
NH8-NH9	24	36	29	57	----	----	----	----	----	146
NH9-NH10	>1	-32	41	----	----	----	----	----	----	9
NH10-NH11	39	-398	>1	----	----	----	----	----	----	-359
NH11-NH12	91	-41	----	----	----	----	----	----	----	49
NH12-END	159	----	----	----	----	----	----	----	----	159
SUM	417	247	5	-175	2,483	1,452	355	25	----	4,810
Beaver Creek										
B1-B2	-3	-11	-27	4	27	47	----	----	----	36
B2-B4	-3	>1	102	28	11	1	----	----	----	140
B4-B5	15	7	43	15	----	----	----	----	----	79
B5-END	12	8	----	----	----	----	----	----	----	20
B3-END	15	2	6	1	----	----	----	----	----	24
SUM	35	6	124	48	38	48	----	----	----	298
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1-END	----	----	----	----	----	1	----	----	----	1
Little Beaver Creek										
LB1-LB2	>1	15	25	-4	----	----	----	----	----	37
LB2-END	3	4	13	----	----	----	----	----	----	20
SUM	3	20	38	-4	----	----	----	----	----	57
White Oak Creek										
WO1-WO2	-138	86	15	-460	-63	23	----	----	----	-538
WO2-WO3	-10	93	-60	>1	----	----	----	----	----	23
WO3-WO4	-17	27	----	----	----	----	----	----	----	9
WO4-END	-2	----	----	----	----	----	----	----	----	-2
SUM	-168	206	-45	-460	-63	23	----	----	----	-508
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	46	21	11	7	1	----	----	----	----	86
BU2-BU3	33	20	5	----	----	----	----	----	----	58
BU3-END	-2	>1	----	----	----	----	----	----	----	-2
SUM	77	41	16	7	1	----	----	----	----	142
Cub Run Creek										
CR1-CR2	-90	-82	-39	----	----	----	----	----	----	-210
CR2-END	6	----	----	----	----	----	----	----	----	6
SUM	-83	-82	-39	----	----	----	----	----	----	-204
Morgan Creek										
M1-M2	22	127	-15	-13	----	----	----	----	----	121
M2-M3	80	24	----	----	----	----	----	----	----	104
M3-END	68	----	----	----	----	----	----	----	----	68
SUM	170	151	-15	-13	----	----	----	----	----	293
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	12	10	-2	----	----	----	----	----	----	21
Indian Creek										
I1-END	-3	>1	-5	----	----	----	----	----	----	-9
Northeast and Burden Creek										
NE1-NE2	8	52	18	92	----	----	----	----	----	171
NE2-NE3	140	27	-1	----	----	----	----	----	----	165
NE3-BE1	525	-39	----	----	----	----	----	----	----	486
BE1-END	625	----	----	----	----	----	----	----	----	625
SUM	1,299	40	17	92	----	----	----	----	----	1,448
Panther Creek										
P1-P2	-1	-4	----	----	----	----	----	----	----	-5
P2-END	8	-3	----	----	----	----	----	----	----	5
SUM	7	-7	----	----	----	----	----	----	----	>1
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 8

1979 to 1990 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1-END	5	----	----	----	----	----	----	----	----	5
Crooked Creek										
C1-END	-4	-2	-4	----	----	----	----	----	----	-10
Little Creek										
L1-L2	-6	16	----	----	----	----	----	----	----	10
L2-L3	-2	-2	----	----	----	----	----	----	----	-4
L3-END	>1	----	----	----	----	----	----	----	----	>1
SUM	-9	15	----	----	----	----	----	----	----	6
Third Fork Creek										
TF1-END	-12	----	----	----	----	----	----	----	----	-12
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
DAM-J1	>1	2	-2	-6	-5	-3	-5	5	1	-12
J1-H4	-31	-12	-9	-37	-29	3	13	104	4	6
H4AB-H5	-120	-75	-36	11	257	210	68	82	----	397
H5-H6	-3	>1	-15	27	146	117	----	----	----	271
H6-END	>1	2	1	-3	----	----	----	----	----	1
H7-END	-1	>1	-2	>1	----	----	----	----	----	-3
SUM	-155	-83	-63	-7	370	326	76	190	4	659
K Branch										
K1-K2	-16	-21	14	-21	-14	9	30	----	----	-18
K2-END	>1	-3	13	----	----	----	----	----	----	10
SUM	-16	-23	27	-21	-14	9	30	----	----	-8
Stinking Creek										
SK1-SK2	-2	1	1	-3	67	1	----	----	----	65
SK2-END	-1	-1	----	----	----	----	----	----	----	-3
SUM	-4	-1	1	-3	67	1	----	----	----	62
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD-NH1	196	38	-19	-5	4	14	63	39	----	330
NH1-NH2	20	-15	-25	-6	-41	2	30	14	----	-20
NH2-NH3	27	-14	211	275	-350	-252	38	----	----	-65
NH3-NH4	>1	39	199	176	-176	250	14	----	----	501
NH4-NH5	-4	32	-165	-223	-297	96	4	----	----	-556
NH5-NH6	5	9	-181	-187	-220	-32	----	----	----	-606
NH6-NH7	-15	-1	1	244	193	----	----	----	----	421
NH7-NH8	-11	-22	15	580	4	----	----	----	----	565
NH8-NH9	-13	-43	-196	328	----	----	----	----	----	77
NH9-NH10	-13	51	-82	----	----	----	----	----	----	-44
NH10-NH11	20	507	4	----	----	----	----	----	----	530
NH11-NH12	35	-19	----	----	----	----	----	----	----	16
NH12-END	24	----	----	----	----	----	----	----	----	24
SUM	271	560	-240	1,182	-883	78	150	53	----	1,172
Beaver Creek										
B1-B2	-95	-133	-20	-45	13	8	----	----	----	-272
B2-B4	-28	-23	-216	-84	19	----	----	----	----	-332
B4-B5	-34	-22	-71	-39	----	----	----	----	----	-165
B5-END	-10	13	----	----	----	----	----	----	----	3
B3-END	-27	-1	-15	----	----	----	----	----	----	-42
SUM	-193	-167	-321	-168	32	8	----	----	----	-808
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1-END	-4	-10	-14	-4	-5	----	----	----	----	-37
Little Beaver Creek										
LB1-LB2	-3	2	-8	7	----	----	----	----	----	-2
LB2-END	-7	-1	1	----	----	----	----	----	----	-7
SUM	-10	1	-7	7	----	----	----	----	----	-9
White Oak Creek										
WO1-WO2	-15	-26	-2	-59	-64	9	----	----	----	-157
WO2-WO3	-10	-72	13	-1	----	----	----	----	----	-70
WO3-WO4	-16	-27	----	----	----	----	----	----	----	-43
WO4-END	-5	----	----	----	----	----	----	----	----	-5
SUM	-46	-125	11	-60	-64	9	----	----	----	-275
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	-37	-22	-21	2	----	----	----	----	----	-78
BU2-BU3	-23	-32	-5	----	----	----	----	----	----	-59
BU3-END	1	-8	----	----	----	----	----	----	----	-8
SUM	-59	-62	-26	2	----	----	----	----	----	-145
Cub Run Creek										
CR1-CR2	126	70	18	----	----	----	----	----	----	215
CR2-END	2	----	----	----	----	----	----	----	----	2
SUM	128	70	18	----	----	----	----	----	----	217
Morgan Creek										
M1-M2	-53	-191	-43	50	----	----	----	----	----	-237
M2-M3	-20	-72	----	----	----	----	----	----	----	-92
M3-END	-7	----	----	----	----	----	----	----	----	-7
SUM	-80	-263	-43	50	----	----	----	----	----	-336
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	-12	-8	>1	----	----	----	----	----	----	-21
Indian Creek										
I1-END	-4	>1	2	----	----	----	----	----	----	-2
Northeast and Burden Creek										
NE1-NE2	-3	-28	-64	16	----	----	----	----	----	-79
NE2-NE3	82	-48	-1	----	----	----	----	----	----	33
NE3-BE1	77	-95	----	----	----	----	----	----	----	-18
BE1-END	-77	----	----	----	----	----	----	----	----	-77
SUM	79	-170	-65	16	----	----	----	----	----	-141
Panther Creek										
P1-P2	-3	-4	----	----	----	----	----	----	----	-8
P2-END	-4	-6	----	----	----	----	----	----	----	-9
SUM	-7	-10	----	----	----	----	----	----	----	-17
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 9

1990 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1-END	4	----	----	----	----	----	----	----	----	4
Crooked Creek										
C1-END	-34	-2	29	----	----	----	----	----	----	-8
Little Creek										
L1-L2	13	3	----	----	----	----	----	----	----	16
L2-L3	17	4	----	----	----	----	----	----	----	21
L3-END	>1	----	----	----	----	----	----	----	----	>1
SUM	29	7	----	----	----	----	----	----	----	37
Third Fork Creek										
TF1-END	-33	----	----	----	----	----	----	----	----	-33
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL)									
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Haw River										
DAM-J1	4	5	>1	4	4	4	12	19	9	61
J1-H4	-105	-51	-60	-54	-50	-29	105	127	65	-51
H4AB-H5	-425	-255	-197	-68	400	352	133	26	18	-16
H5-H6	-9	1	17	67	297	303	20	----	----	697
H6-END	-2	3	8	-3	----	----	----	----	----	5
H7-END	-3	-3	-7	-3	----	----	----	----	----	-16
SUM	-541	-299	-239	-57	652	629	270	172	92	679
K Branch										
K1-K2	-12	-2	-37	-5	-3	73	80	----	----	94
K2-END	-3	-2	-3	----	----	----	----	----	----	-8
SUM	-15	-5	-39	-5	-3	73	80	----	----	86
Stinking Creek										
SK1-SK2	-32	4	-11	-1	54	2	----	----	----	16
SK2-END	1	4	----	----	----	----	----	----	----	5
SUM	-30	8	-11	-1	54	2	----	----	----	21
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
New Hope River										
H4CD-NH1	268	104	62	72	63	63	112	67	----	810
NH1-NH2	7	198	7	-15	36	100	93	11	----	437
NH2-NH3	16	218	25	33	95	610	214	----	----	1,210
NH3-NH4	-18	26	25	72	15	488	82	----	----	690
NH4-NH5	13	114	45	96	208	218	4	----	----	700
NH5-NH6	46	120	-15	67	617	49	----	----	----	885
NH6-NH7	-7	-27	-117	25	552	1	----	----	----	428
NH7-NH8	-2	-7	-61	272	14	----	----	----	----	215
NH8-NH9	11	-7	-167	386	----	----	----	----	----	223
NH9-NH10	-13	20	-42	----	----	----	----	----	----	-35
NH10-NH11	58	109	3	----	----	----	----	----	----	171
NH11-NH12	125	-60	----	----	----	----	----	----	----	65
NH12-END	183	----	----	----	----	----	----	----	----	183
SUM	688	807	-234	1,008	1,600	1,530	505	78	----	5,982
Beaver Creek										
B1-B2	-99	-145	-47	-41	40	55	----	----	----	-236
B2-B4	-30	-22	-114	-56	30	1	----	----	----	-192
B4-B5	-19	-15	-28	-24	----	----	----	----	----	-87
B5-END	2	21	----	----	----	----	----	----	----	23
B3-END	-11	1	-8	1	----	----	----	----	----	-18
SUM	-158	-161	-198	-120	70	56	----	----	----	-510
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Weaver Creek										
W1-END	-4	-10	-14	-4	-5	1	----	----	----	-36
Little Beaver Creek										
LB1-LB2	-3	17	17	3	----	----	----	----	----	35
LB2-END	-4	3	14	----	----	----	----	----	----	13
SUM	-7	21	31	3	----	----	----	----	----	48
White Oak Creek										
WO1-WO2	-153	60	13	-519	-128	32	----	----	----	-694
WO2-WO3	-20	21	-47	-1	----	----	----	----	----	-47
WO3-WO4	-33	-1	----	----	----	----	----	----	----	-34
WO4-END	-8	----	----	----	----	----	----	----	----	-8
SUM	-215	81	-34	-519	-128	32	----	----	----	-783
	240-230	**230-220**	**220-210**	**210-200**	**200-190**	**190-180**	**180-170**	**170-160**	**160-150**	**TOTAL**

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Bush Creek										
BU1-BU2	9	-1	-10	9	1	----	----	----	----	8
BU2-BU3	11	-12	>1	----	----	----	----	----	----	-1
BU3-END	-1	-9	----	----	----	----	----	----	----	-10
SUM	19	-21	-9	9	1	----	----	----	----	-2
Cub Run Creek										
CR1-CR2	37	-11	-21	----	----	----	----	----	----	5
CR2-END	8	----	----	----	----	----	----	----	----	8
SUM	45	-11	-21	----	----	----	----	----	----	13
Morgan Creek										
M1-M2	-32	-64	-57	37	----	----	----	----	----	-116
M2-M3	59	-49	----	----	----	----	----	----	----	10
M3-END	61	----	----	----	----	----	----	----	----	61
SUM	88	-113	-57	37	----	----	----	----	----	-45
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Lick Branch										
LK1-END	>1	2	-2	----	----	----	----	----	----	>1
Indian Creek										
I1-END	-7	>1	-4	----	----	----	----	----	----	-11
Northeast and Burden Creek										
NE1-NE2	6	25	-46	108	----	----	----	----	----	92
NE2-NE3	221	-21	-2	----	----	----	----	----	----	198
NE3-BE1	602	-134	----	----	----	----	----	----	----	468
BE1-END	549	----	----	----	----	----	----	----	----	549
SUM	1,378	-130	-48	108	----	----	----	----	----	1,307
Panther Creek										
P1-P2	-4	-8	----	----	----	----	----	----	----	-13
P2-END	5	-9	----	----	----	----	----	----	----	-4
SUM	>1	-17	----	----	----	----	----	----	----	-17
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

Table 10

1979 to 1997 Sediment Volume Change (acre-feet)

Segment	Elevation Interval (feet MSL) 240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL
Kit Creek										
KT1-END	9	----	----	----	----	----	----	----	----	9
Crooked Creek										
C1-END	-38	-5	25	----	----	----	----	----	----	-18
Little Creek										
L1-L2	7	20	----	----	----	----	----	----	----	26
L2-L3	15	2	----	----	----	----	----	----	----	17
L3-END	-1	----	----	----	----	----	----	----	----	-1
SUM	21	22	----	----	----	----	----	----	----	43
Third Fork Creek										
TF1-END	-46	----	----	----	----	----	----	----	----	-46
	240-230	230-220	220-210	210-200	200-190	190-180	180-170	170-160	160-150	TOTAL

RESERVOIR SEDIMENT
DATA SUMMARY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

B. EVERETT JORDAN
NAME OF RESERVOIR

DATA SHEET NO.

DAM

1. OWNER US Army Corps of Engrs.	2. STREAM Haw River	3. STATE North Carolina
4. SEC. TWP. RANGE	5. NEAREST P.O. Moncure	6. COUNTY Chatham
7. LAT. 35° 34′ 00″ LONG. 79° 04′ 00″	8. TOP OF DAM ELEVATION 266.5	9. SPILLWAY CREST ELEV. 240.0

RESERVOIR

10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. ORIGINAL SURFACE AREA, ACRES	13. ORIGINAL CAPACITY, ACRE-FEET	14. GROSS STORAGE, ACRE-FEET	15. DATE STORAGE BEGAN
a. FLOOD CONTROL	240	31,811	538,430	753,557	Jan 1979
b. MULTIPLE USE					
c. POWER					
d. WATER SUPPLY					16. DATE NORMAL OPER. BEGAN
e. IRRIGATION					
f. CONSERVATION	216	13,942	140,427	215,127	Feb 1982
g. INACTIVE	202	6,658	74,700	74,700	

17. LENGTH OF RESERVOIR 27.74[1] MILES; AV. WIDTH OF RESERVOIR 1.79 MILES

WATERSHED

18. TOTAL DRAINAGE AREA 1,690 SQ. MI.		22. MEAN ANNUAL PRECIPITATION 44.59 (61) INCHES	
19. NET SEDIMENT CONTRIBUTING AREA 1,690 SQ. MI.		23. MEAN ANNUAL RUNOFF 13.02 (61) INCHES	
20. LENGTH 74.9 MILES	AV. WIDTH 22.6 MILES	24. MEAN ANNUAL RUNOFF 1,173,463 AC.-FT.	
21. MAX. ELEV. 1,000 ft MSL	MIN. ELEV. 159 ft MSL	25. ANNUAL TEMP: MEAN 61°F RANGE -9°F - 108°F	

SURVEY DATA

26. DATE OF SURVEY	27. PERIOD YEARS	28. ACCL. YEARS	29. TYPE OF SURVEY	30. NO. OF RANGES OR CONTOUR INT.	31. SURFACE AREA, ACRES	32. CAPACITY, ACRE-FEET	33. C/I. RATIO, AC.-FT. PER AC.-FT.
Jan. 1979			Range	55	31,811	753,557	0.64
Jan. 1990	11.0	11.0	Range	54	31,811	747,147	0.64
May 1997	7.4	18.4	Range	55	31,811	746,837	0.64

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-FT.	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE
Jan. 1990	44.7	1,217,597	1,876,530	13,393,568	1,217,597	13,393,568
May 1997	44.7	1,258,009	1,662,245	8,806,063	1,233,313	22,199,630

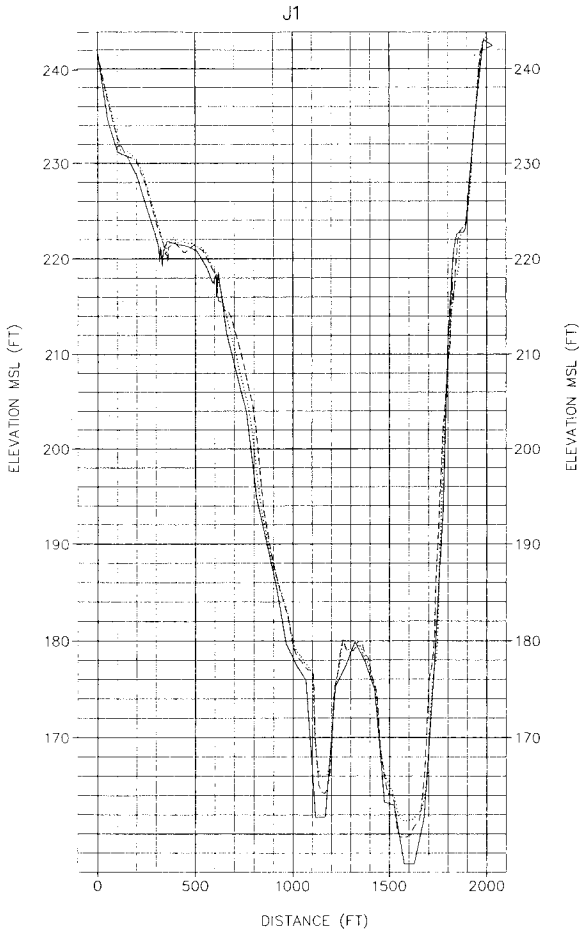
26. DATE OF SURVEY	37. PERIOD CAPACITY LOSS, ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YEAR
Jan. 1990	6,410	583	0.34	6,410	583	0.34
May 1997	310	42	0.02	6,720	365	0.22

26. DATE OF SURVEY	39. AV. DRY WGT., LBS. PER CU. FT.	40. SED. DEP., TONS PER SQ. MI.-YR.		41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANN.	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DATE
Jan. 1990	*	*	*	0.08	0.85	*	*
May 1997	*	*	*	0.05	0.89	*	*

ENG FORM NOV 66 1787 PREVIOUS EDITIONS ARE OBSOLETE.

APPENDIX C

SEDIMENTATION RANGE PROFILES



LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

B. EVERETT JORDAN DAM & LAKE

CAPE FEAR RIVER BASIN

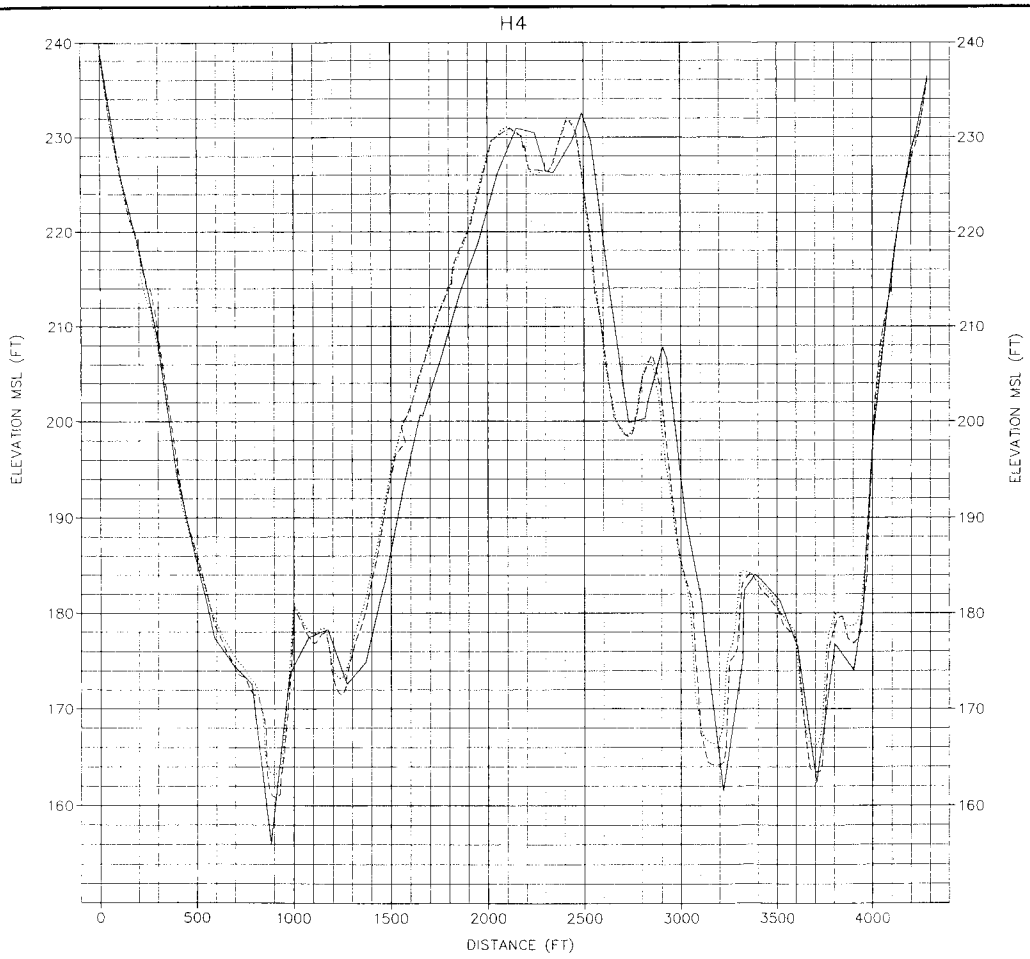
NORTH CAROLINA

SEDIMENTATION RANGE

J1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT



LEGEND:

1997 SURVEY

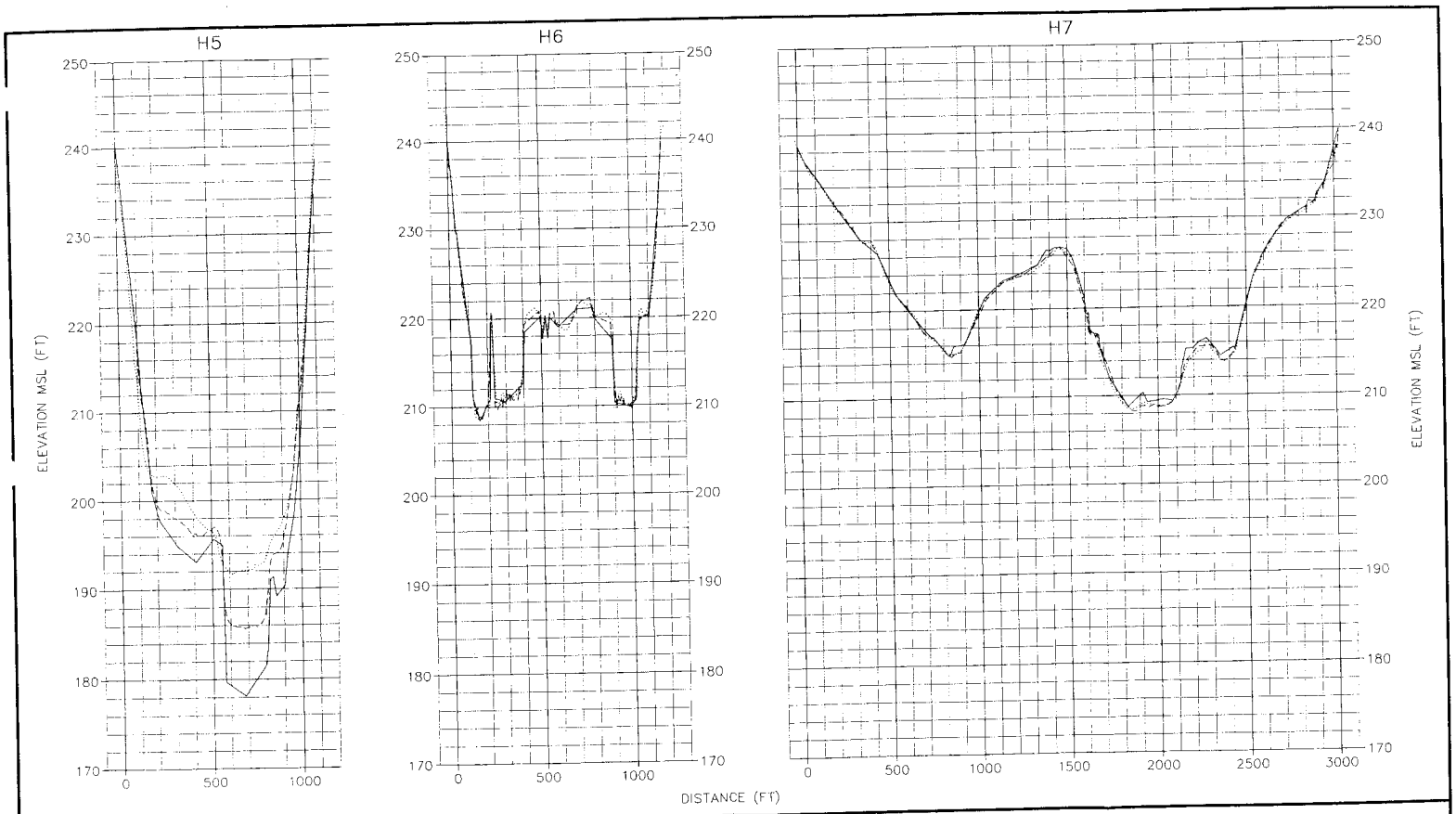
1990 SURVEY

1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
H4

OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

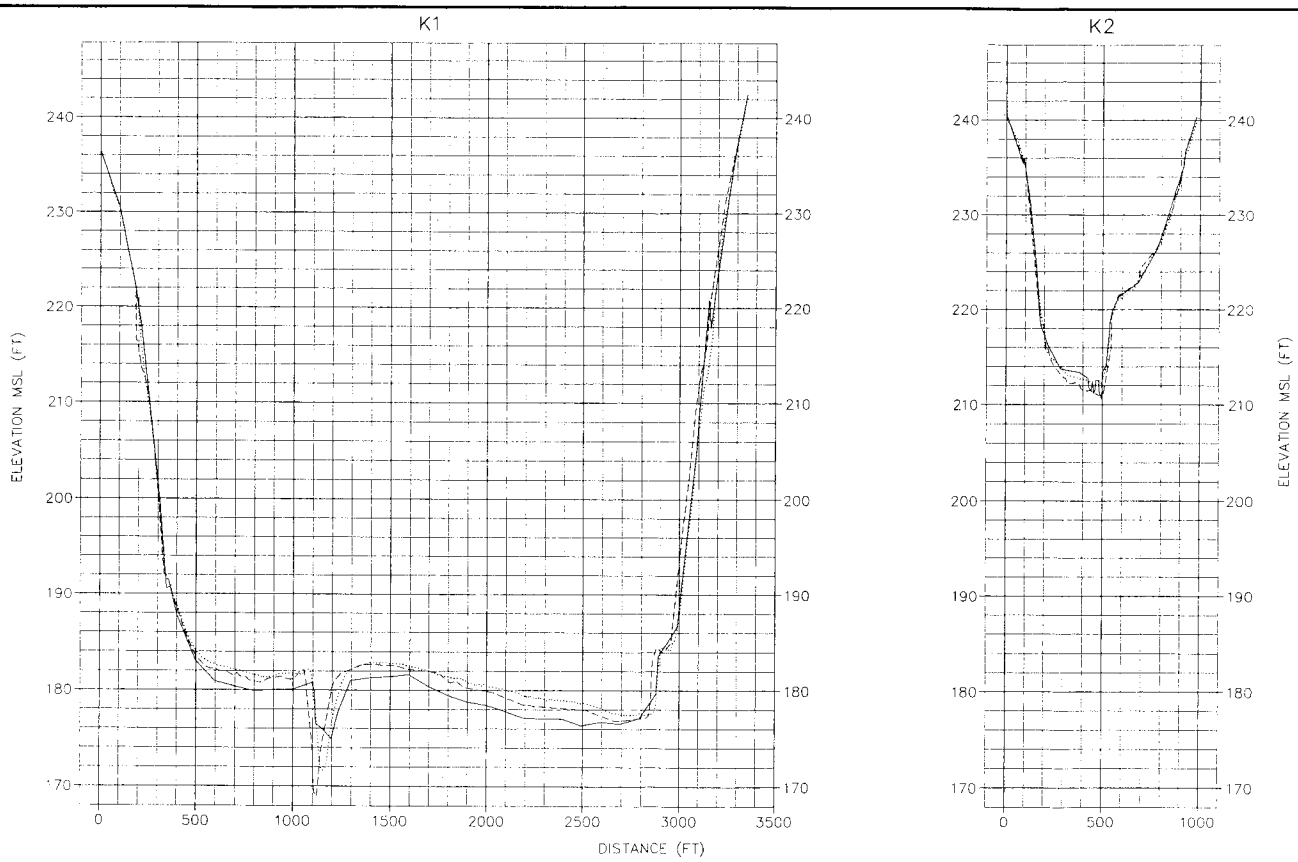


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
H5, H6, & H7

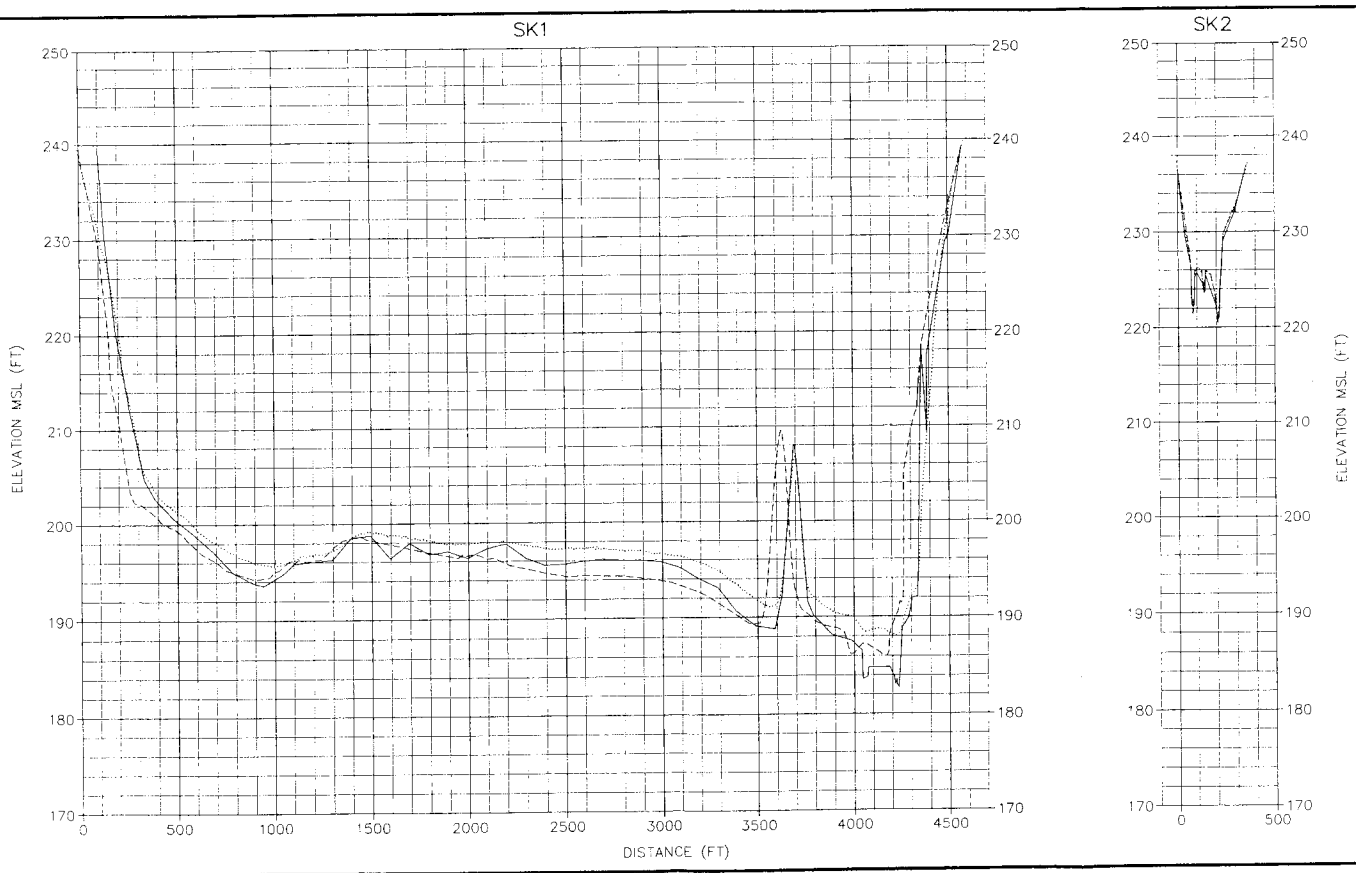


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
K1 & K2

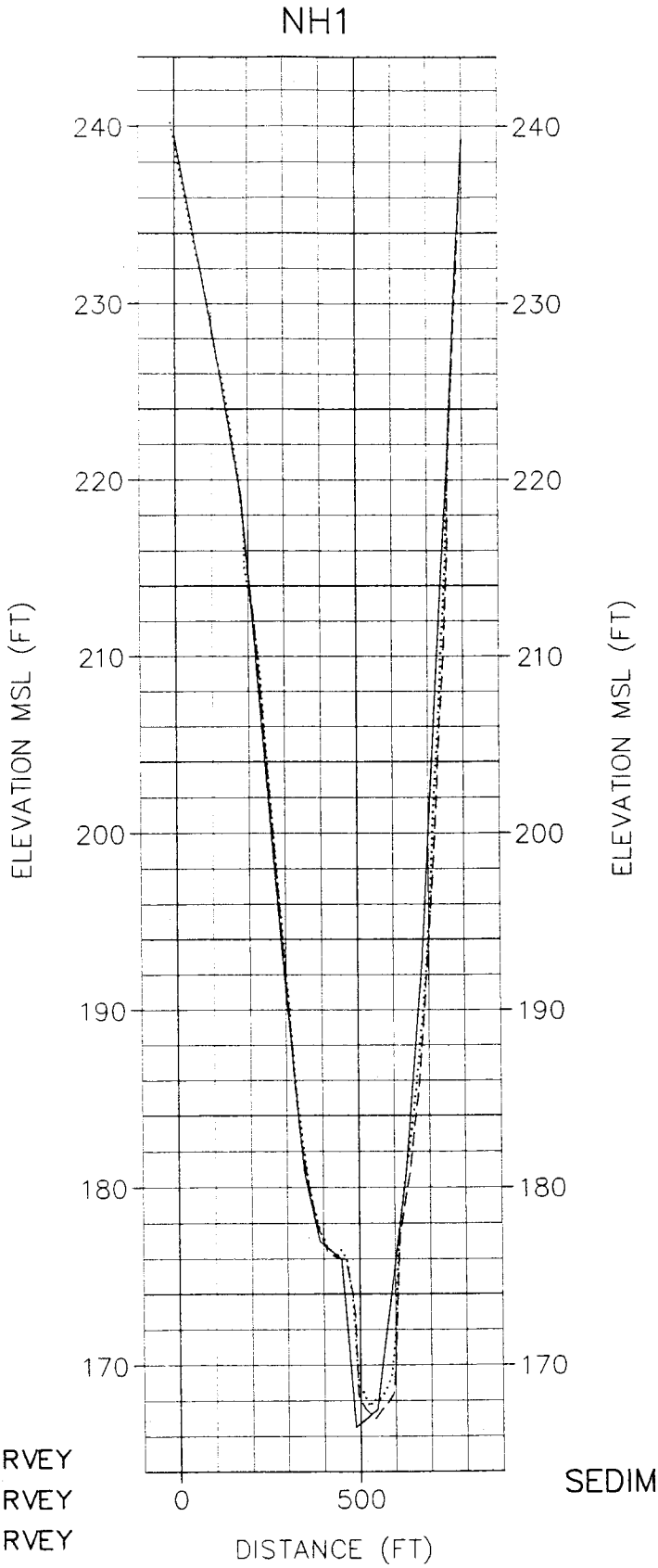


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
SK1 & SK2



LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

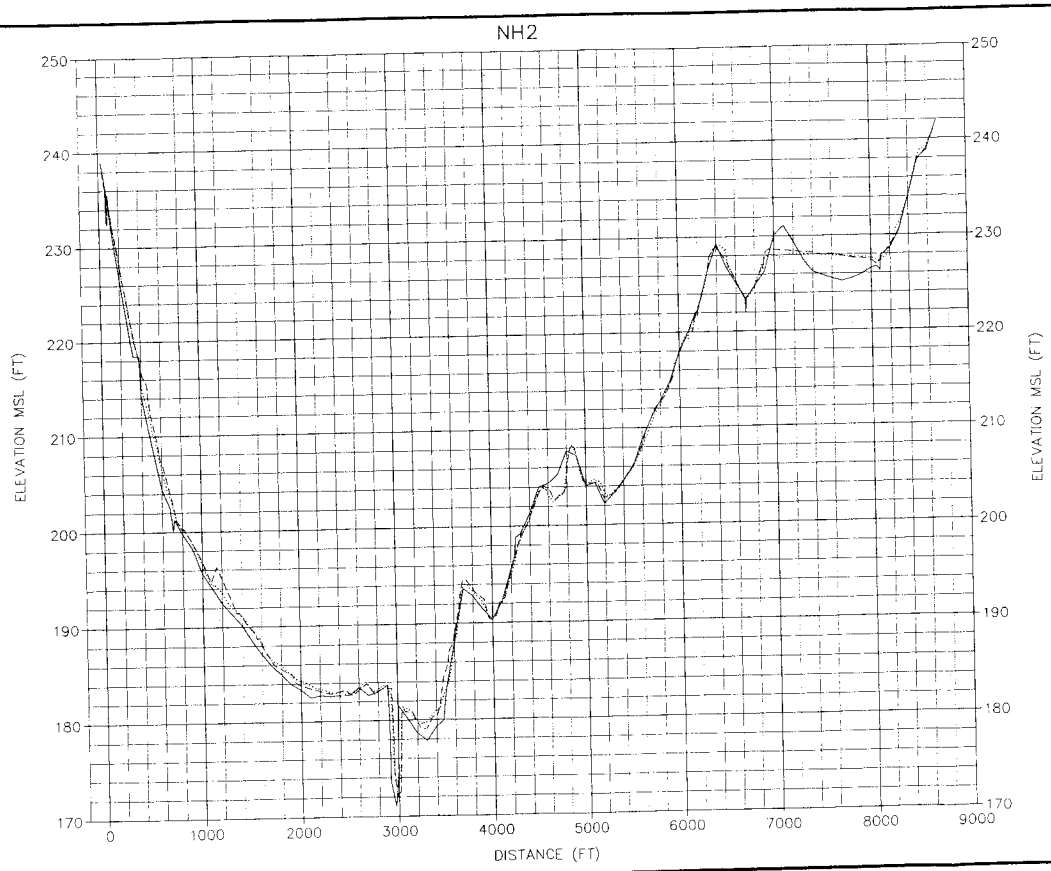
SEDIMENTATION RANGE

NH1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA



OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

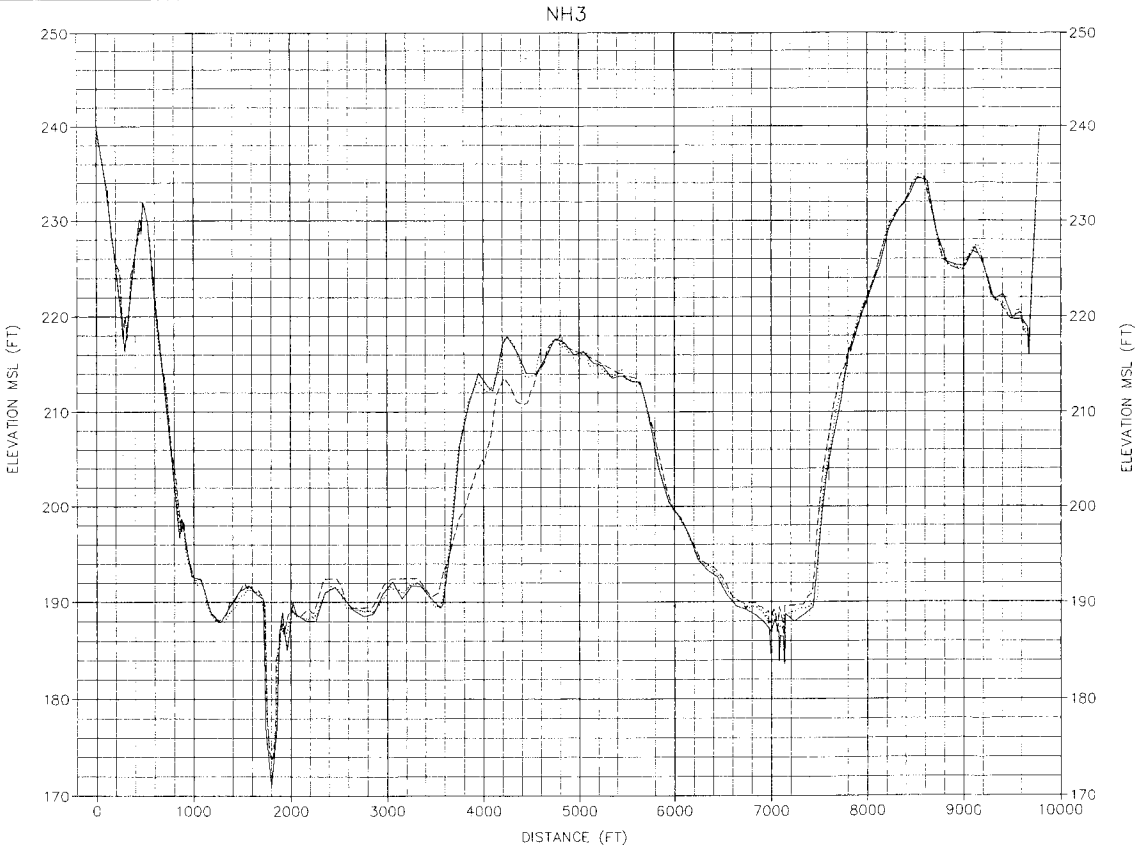
B. EVERETT JORDAN DAM & LAKE

CAPE FEAR RIVER BASIN

NORTH CAROLINA

SEDIMENTATION RANGE

NH2

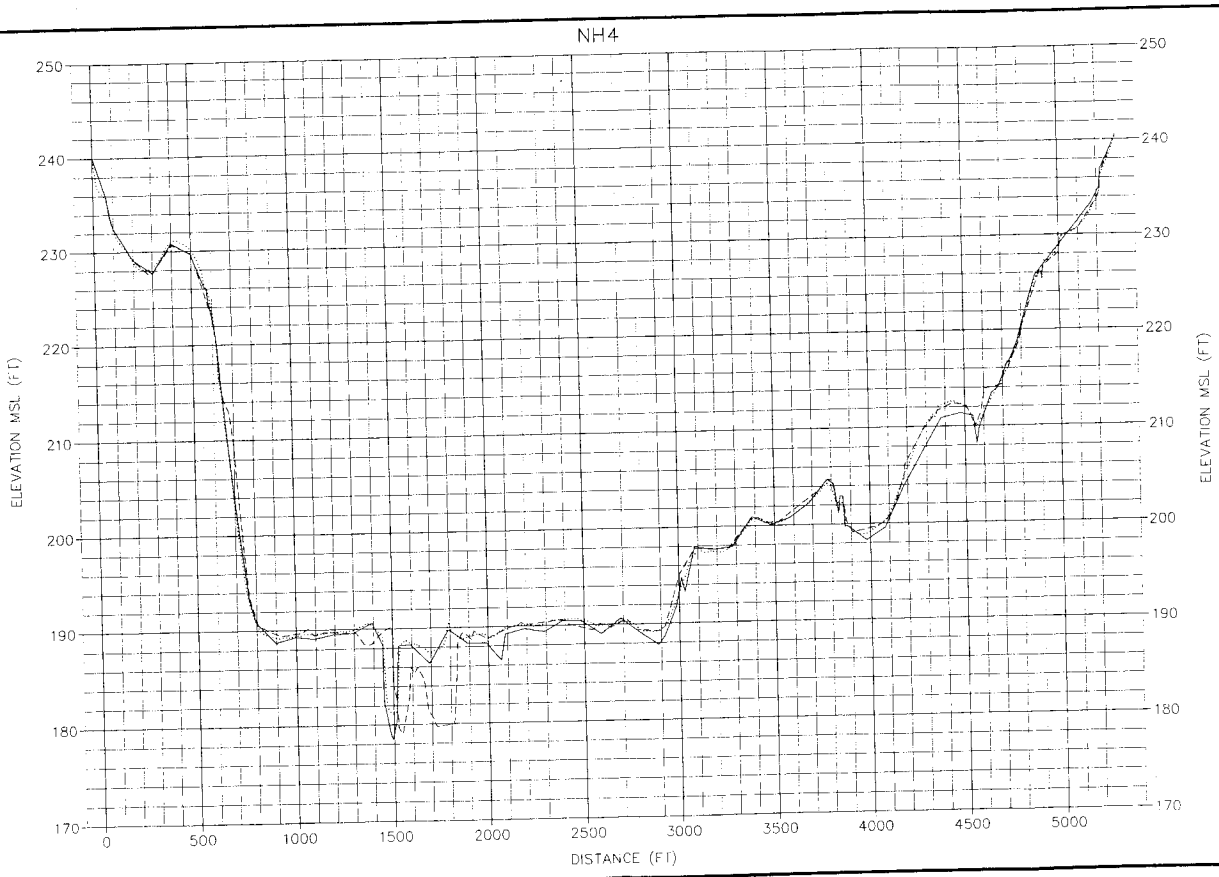


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH3

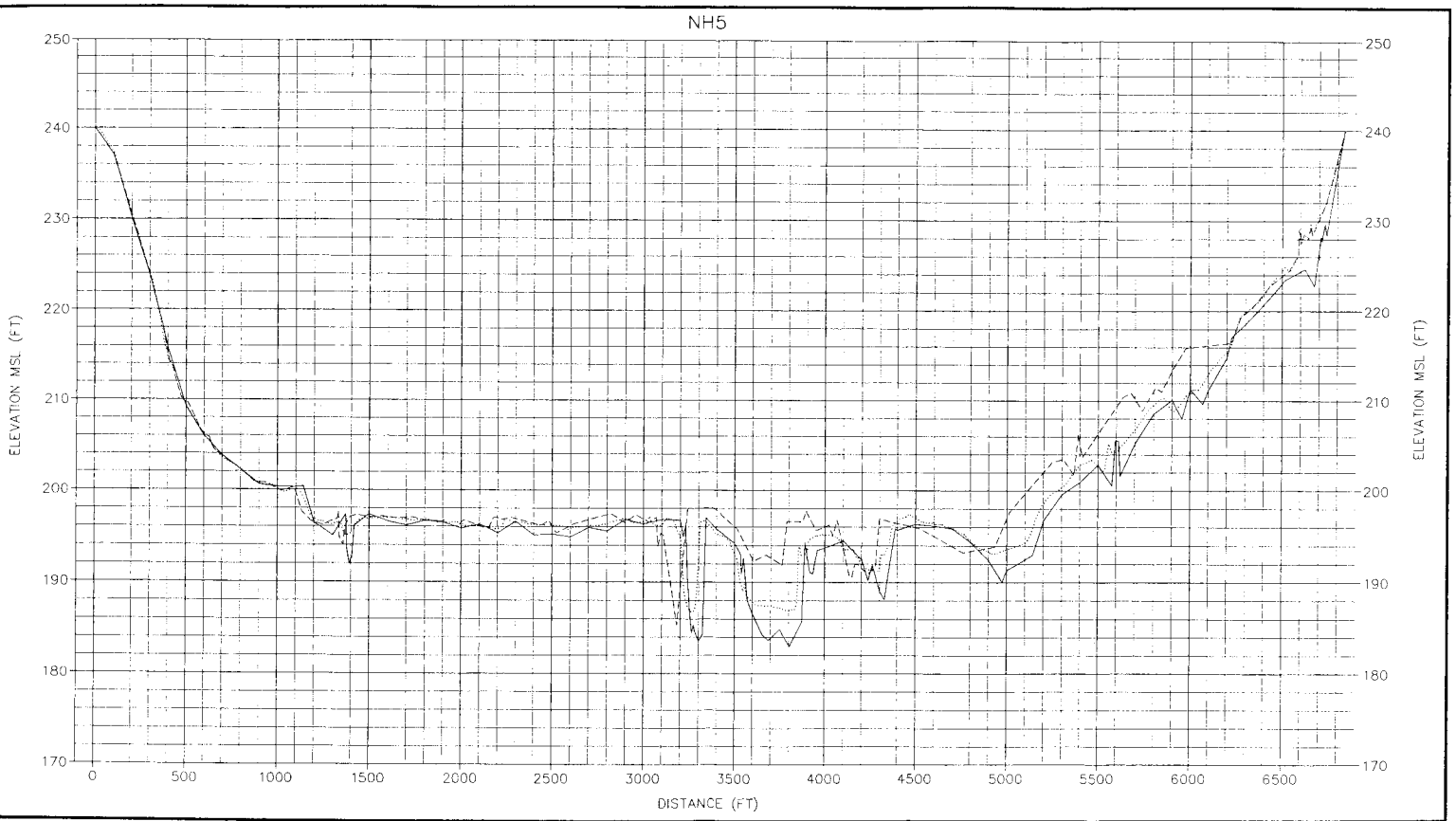


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH4

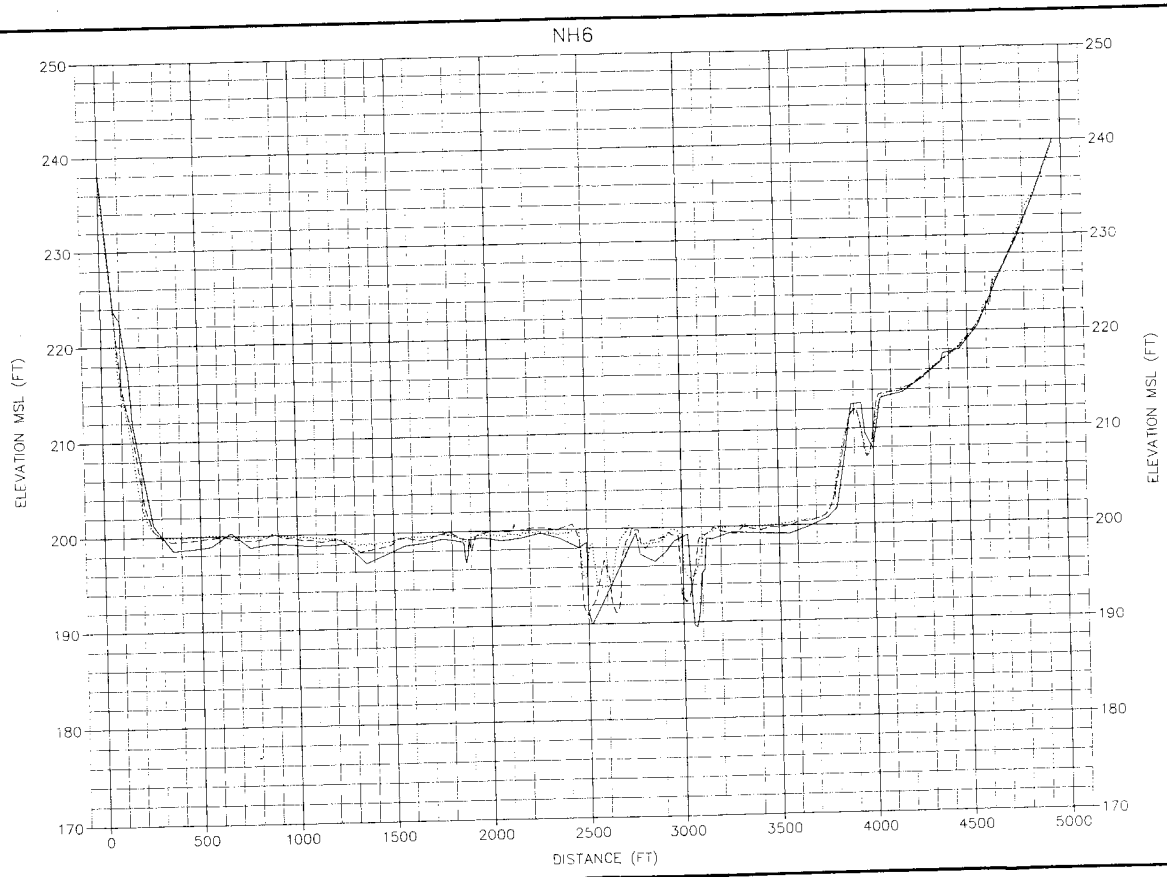


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH5

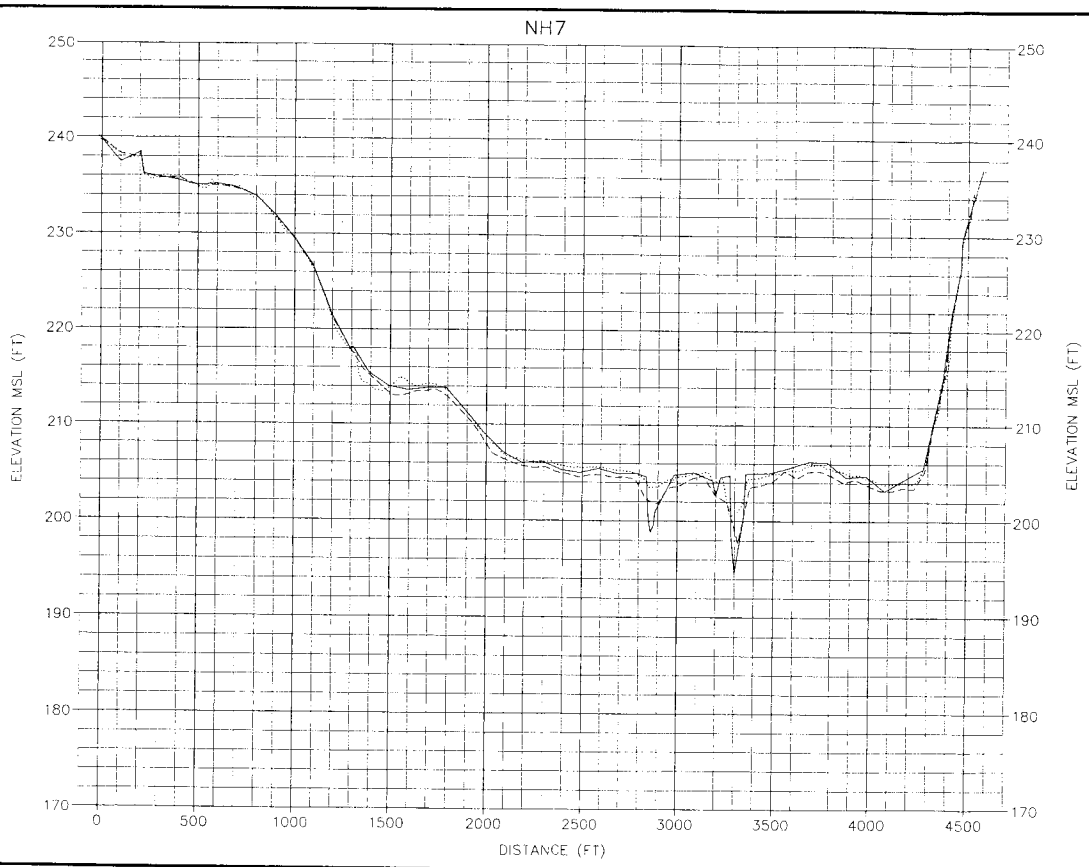


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH6

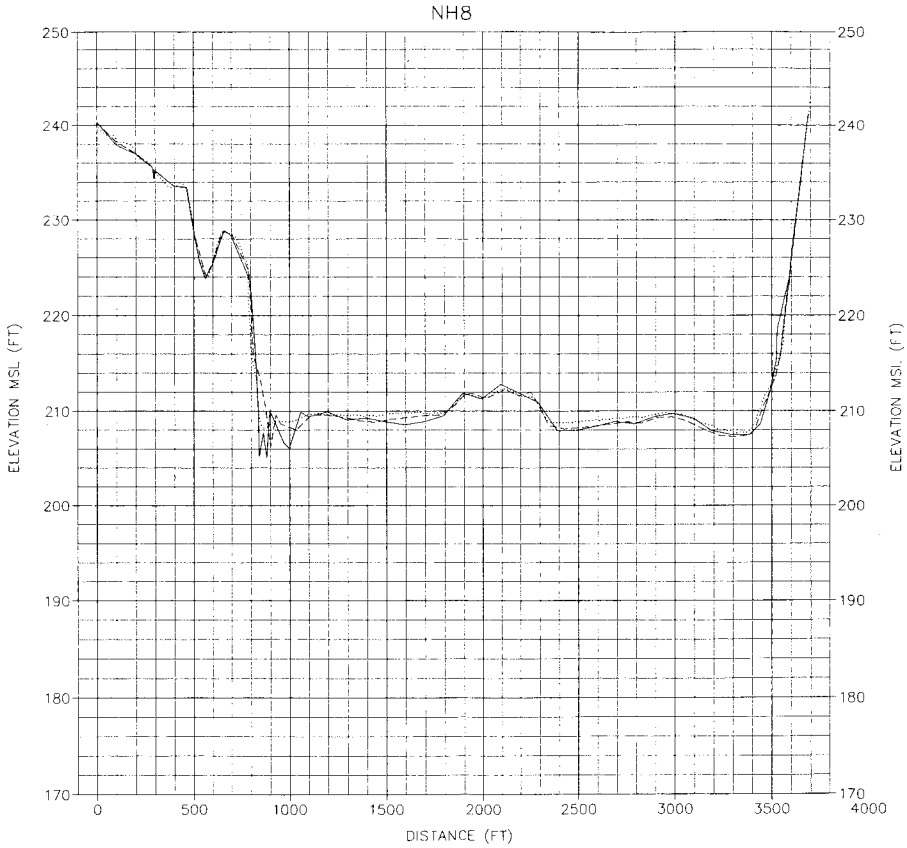


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH7

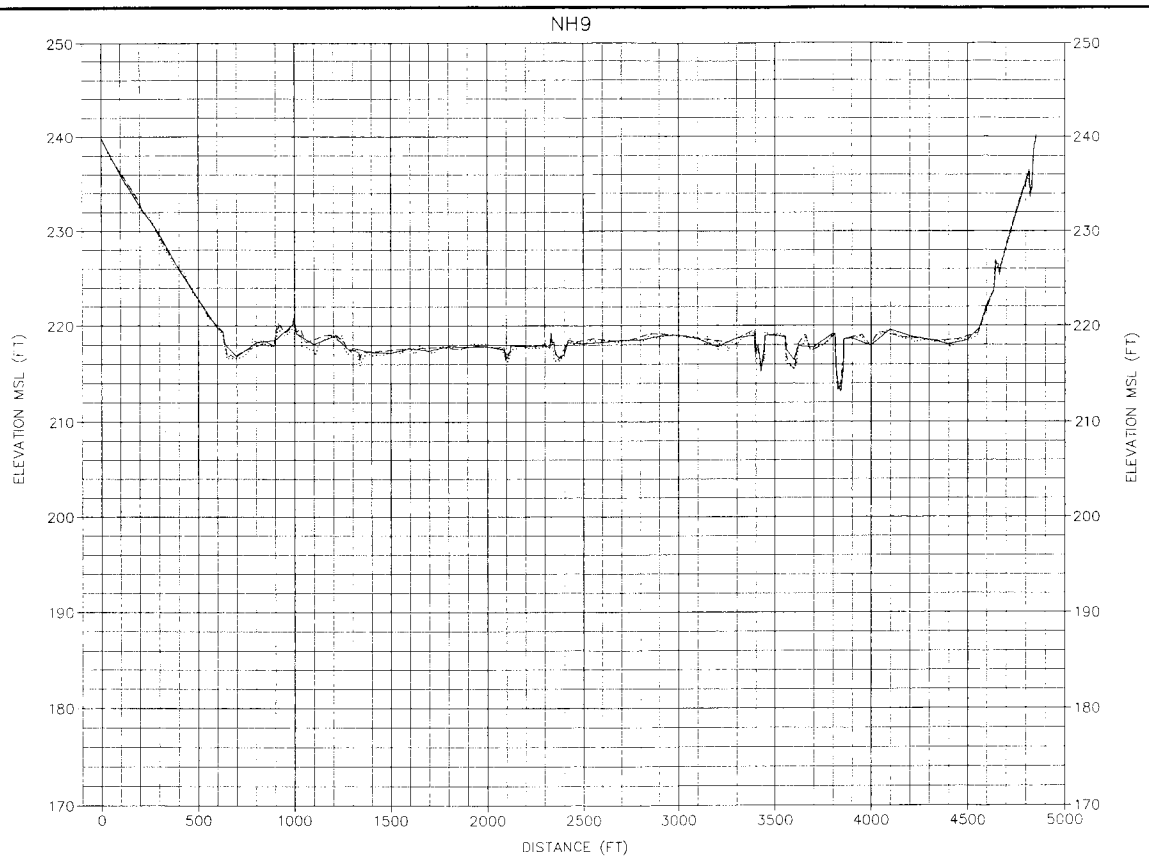


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH8S

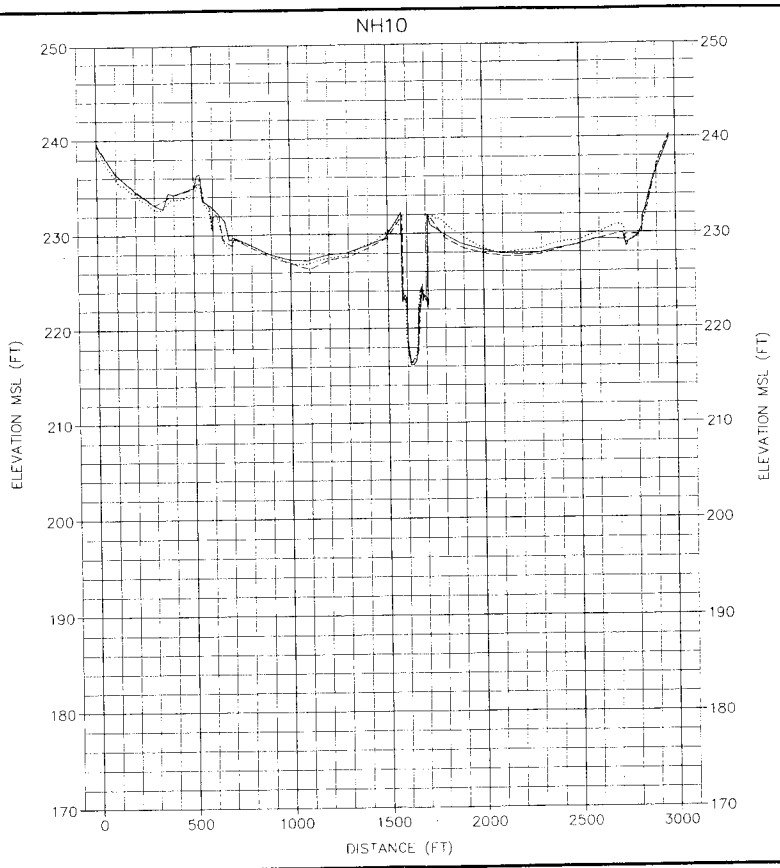


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH9S

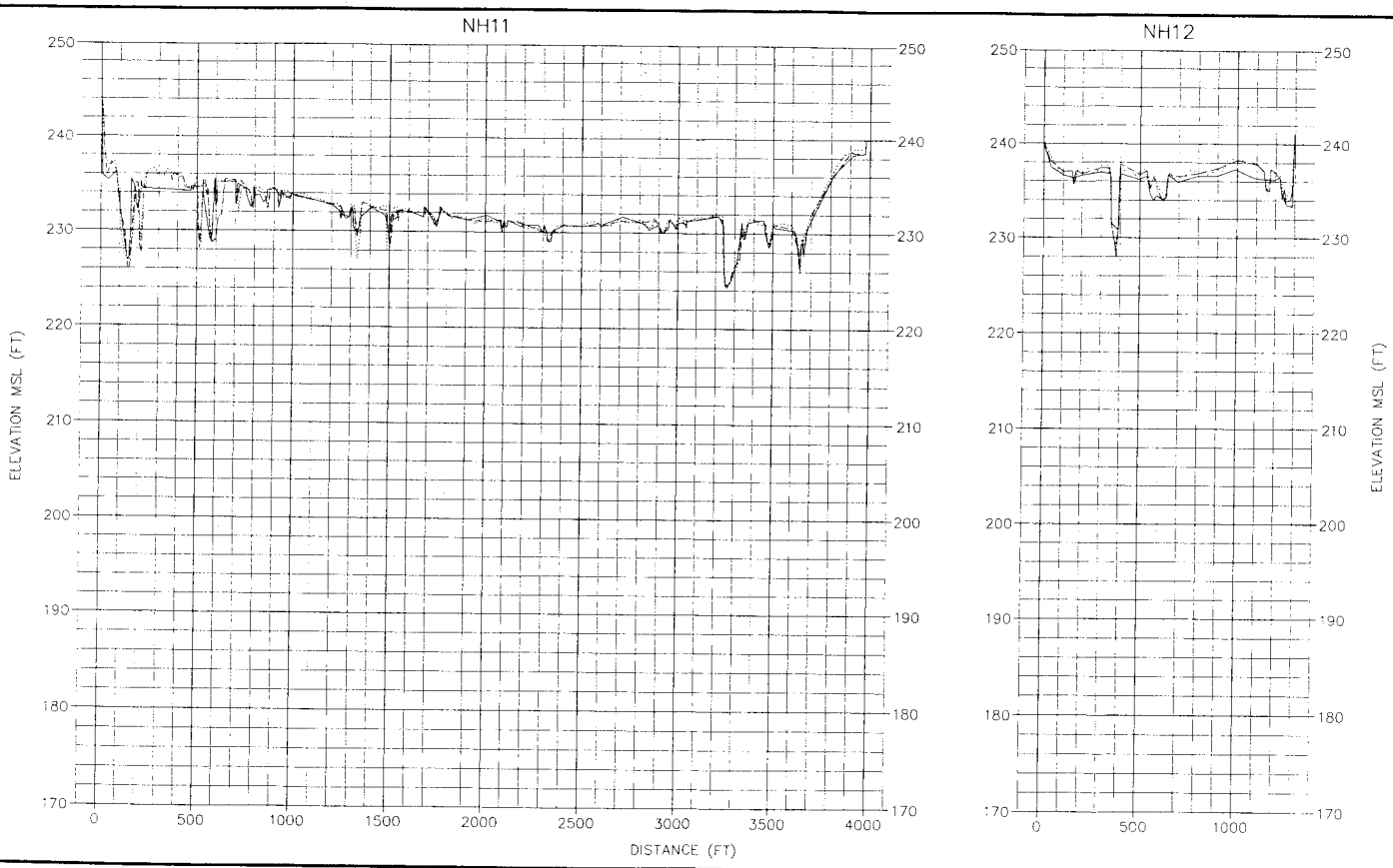


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
NH10

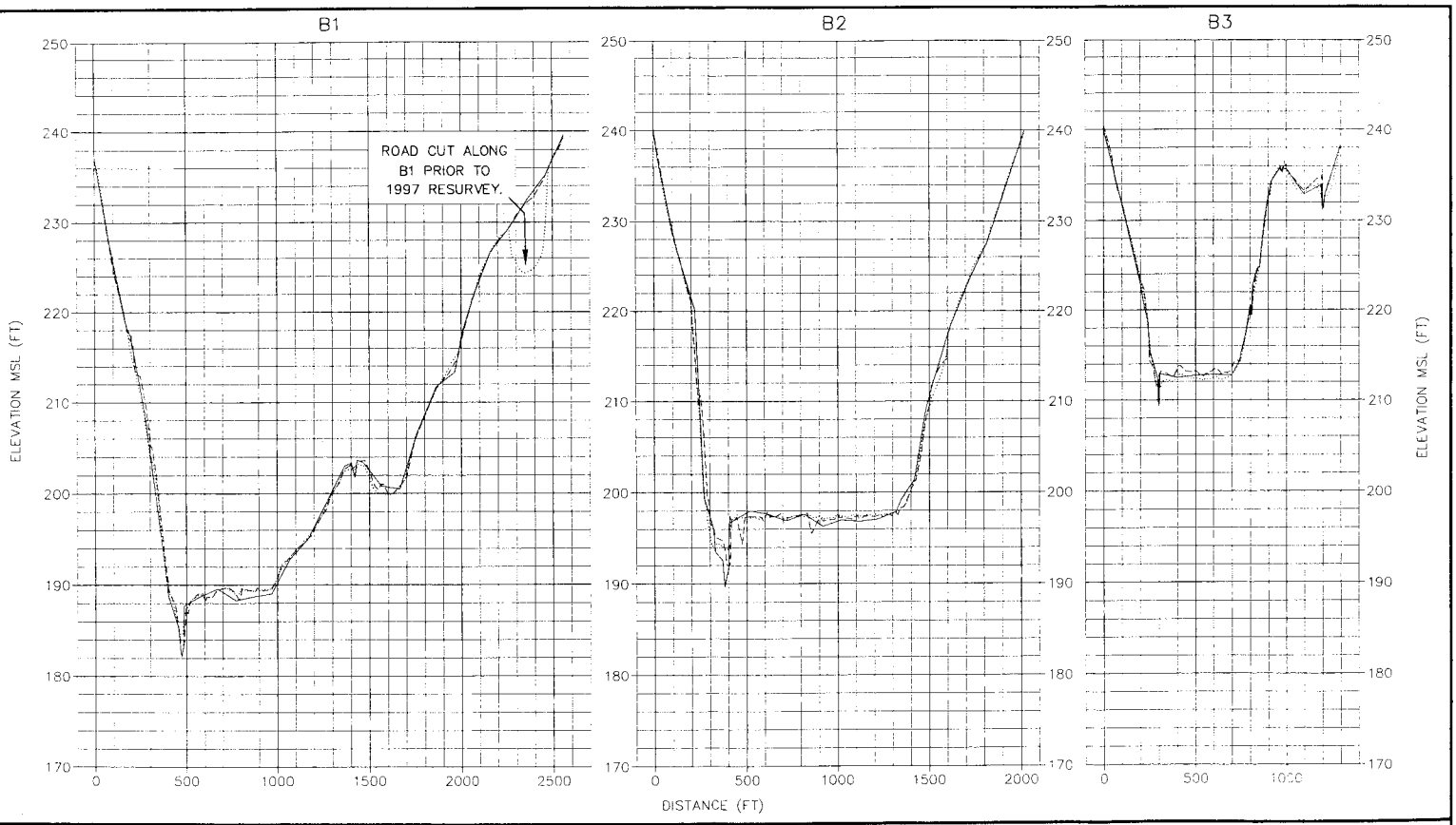


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
NH11 & NH12

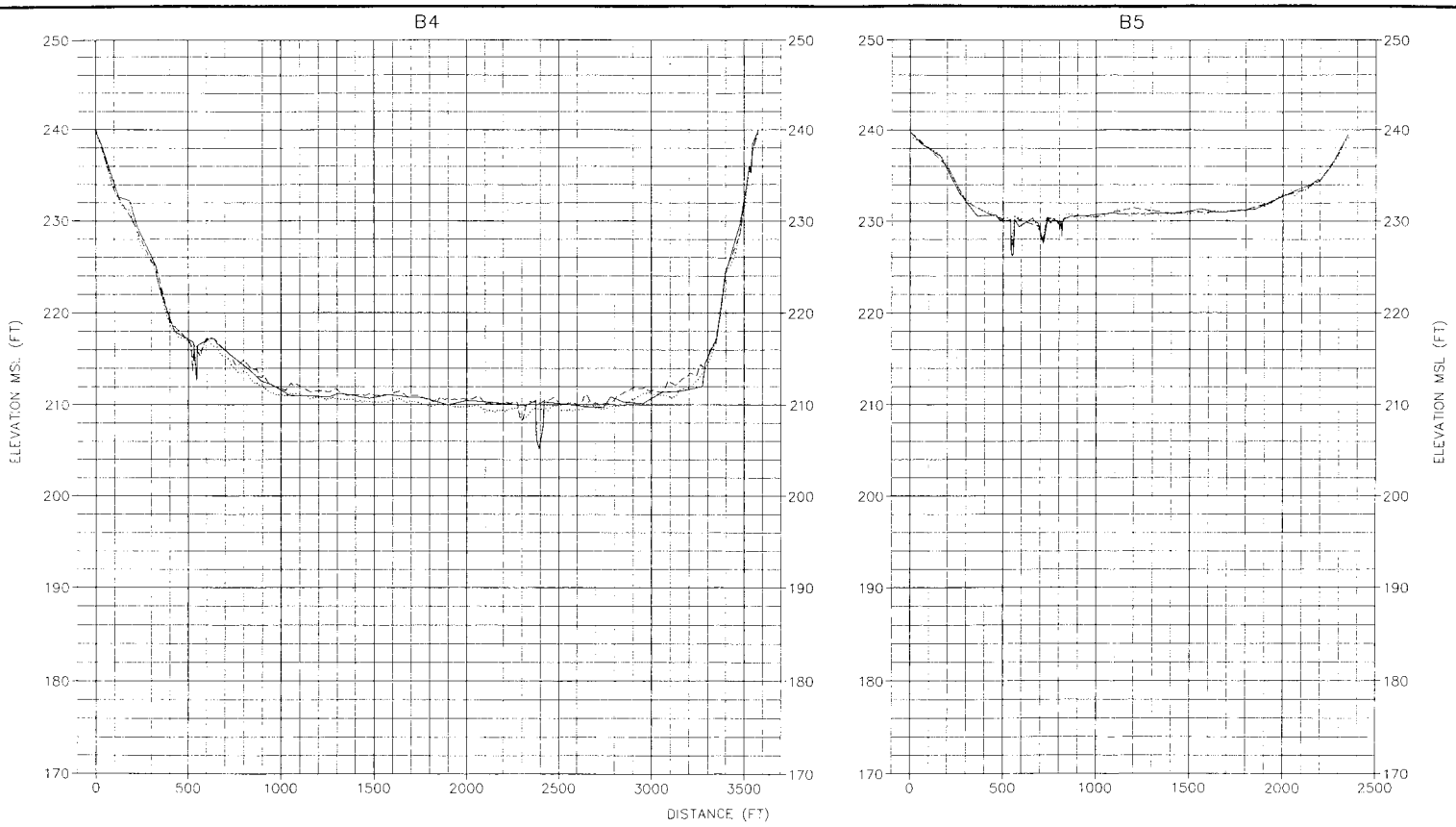


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
B1, B2, & B3

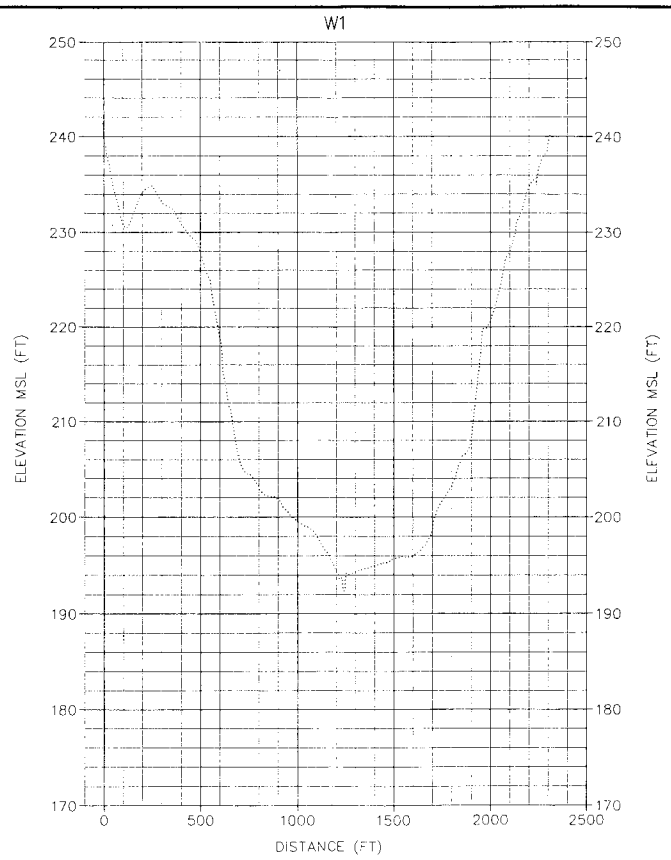


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
B4 & B5



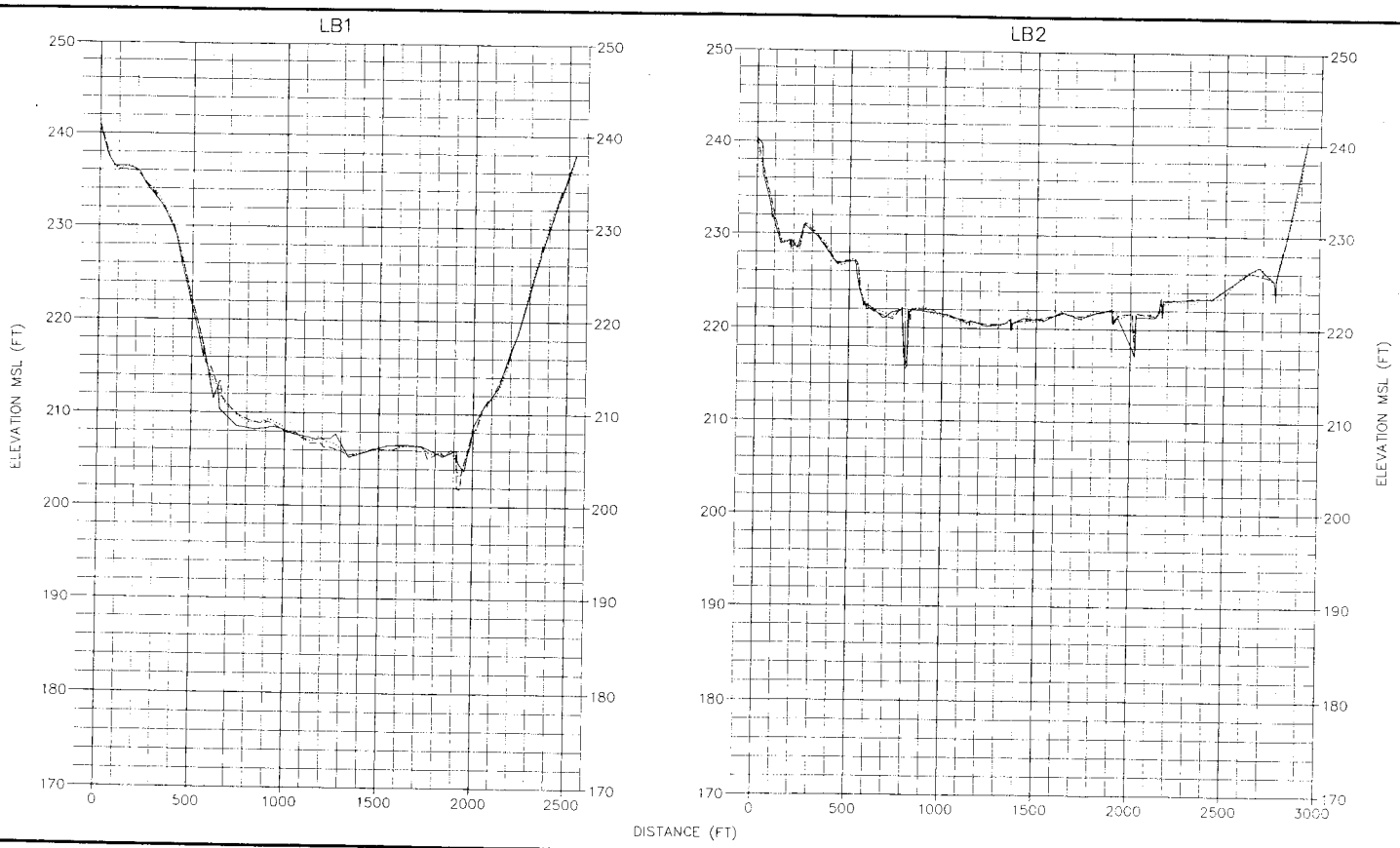
RANGE W1 RELOCATED DUE TO NEW BRIDGE CONSTRUCTION.
ONLY 1997 RESURVEY DATA SHOWN.

OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
W1

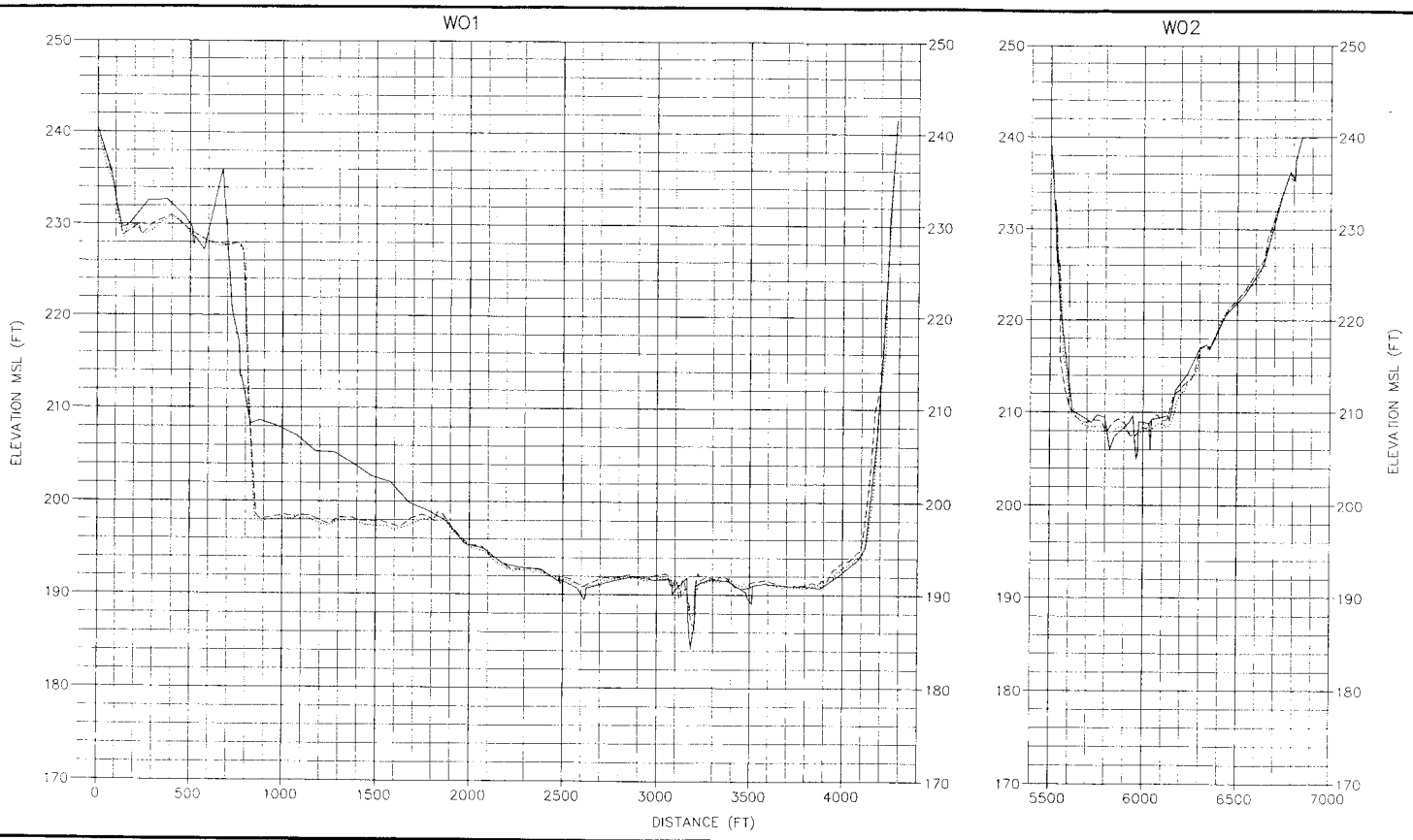


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
LB1 & LB2

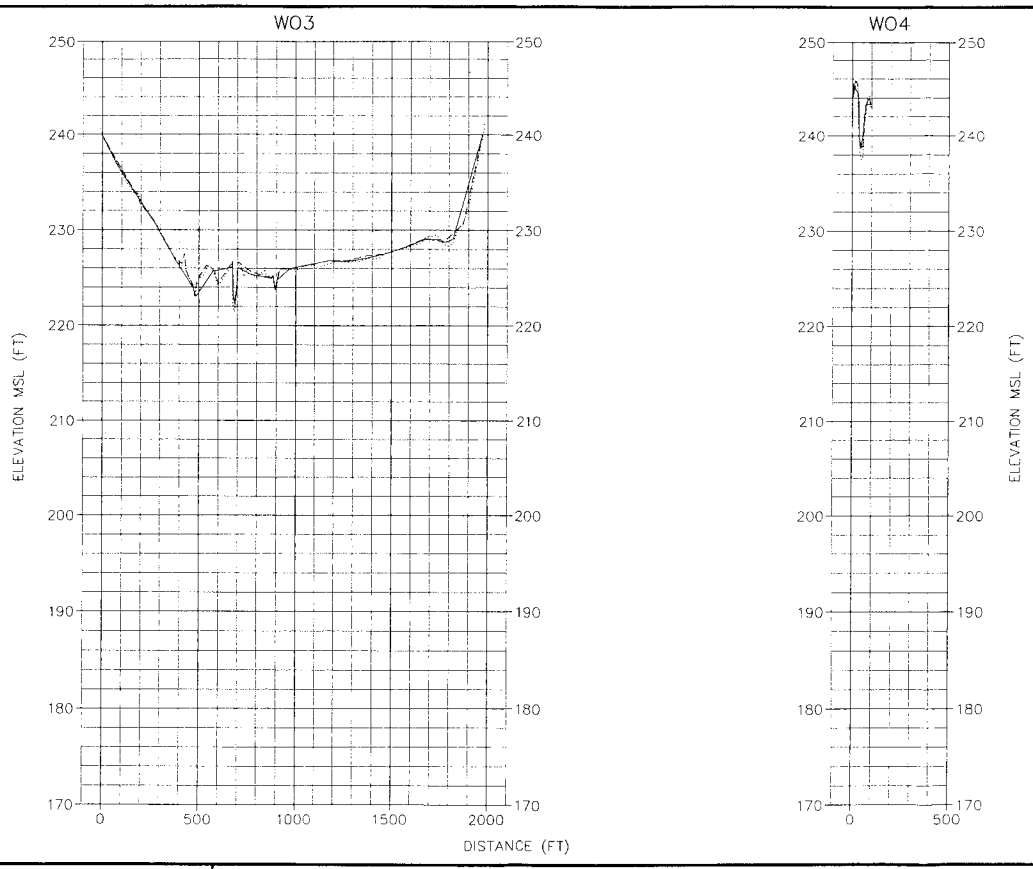


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
WO1 & WO2

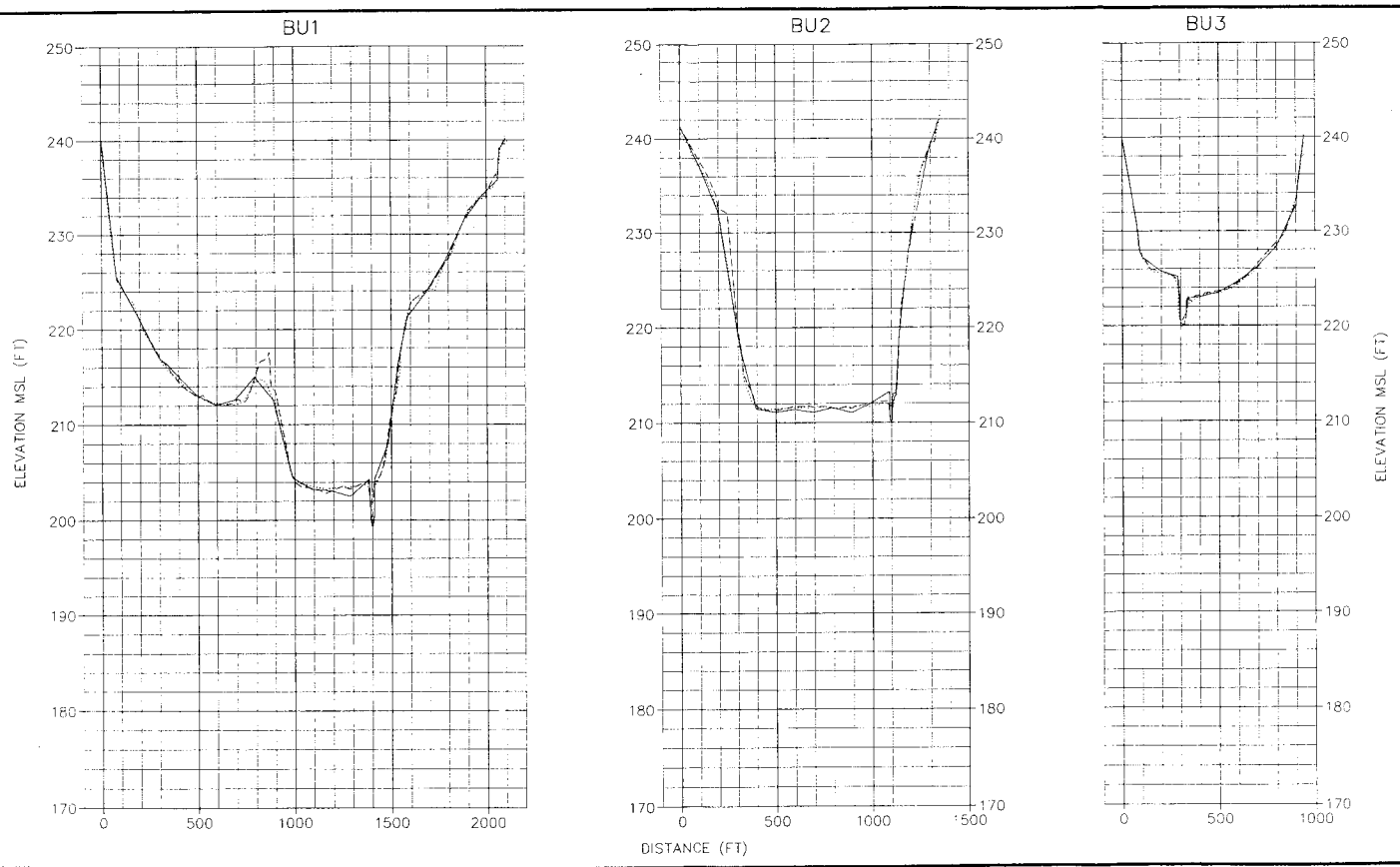


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
WO3 & WO4

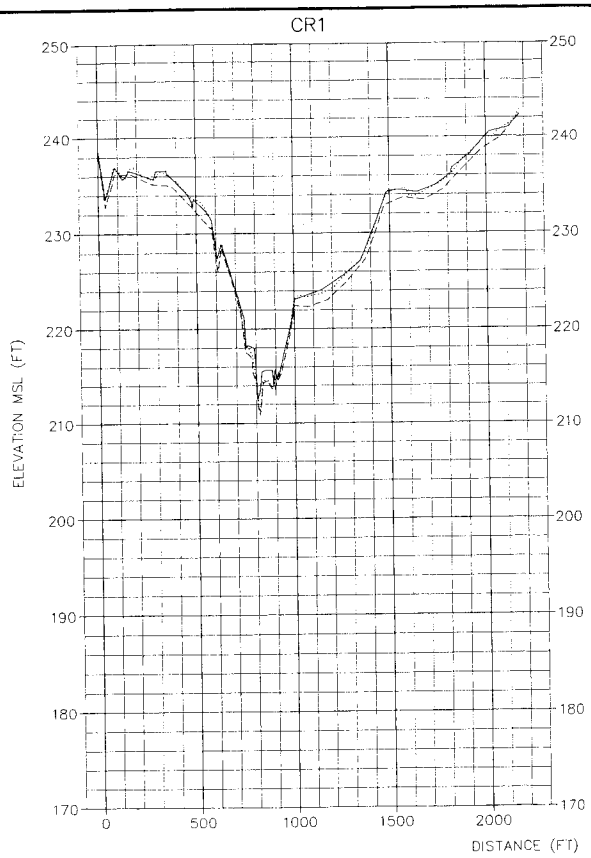


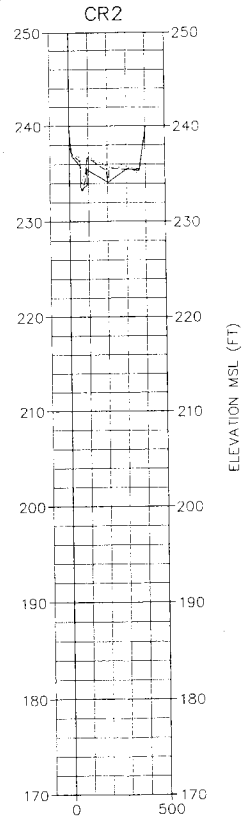
OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
BU1, BU2, & BU3





OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

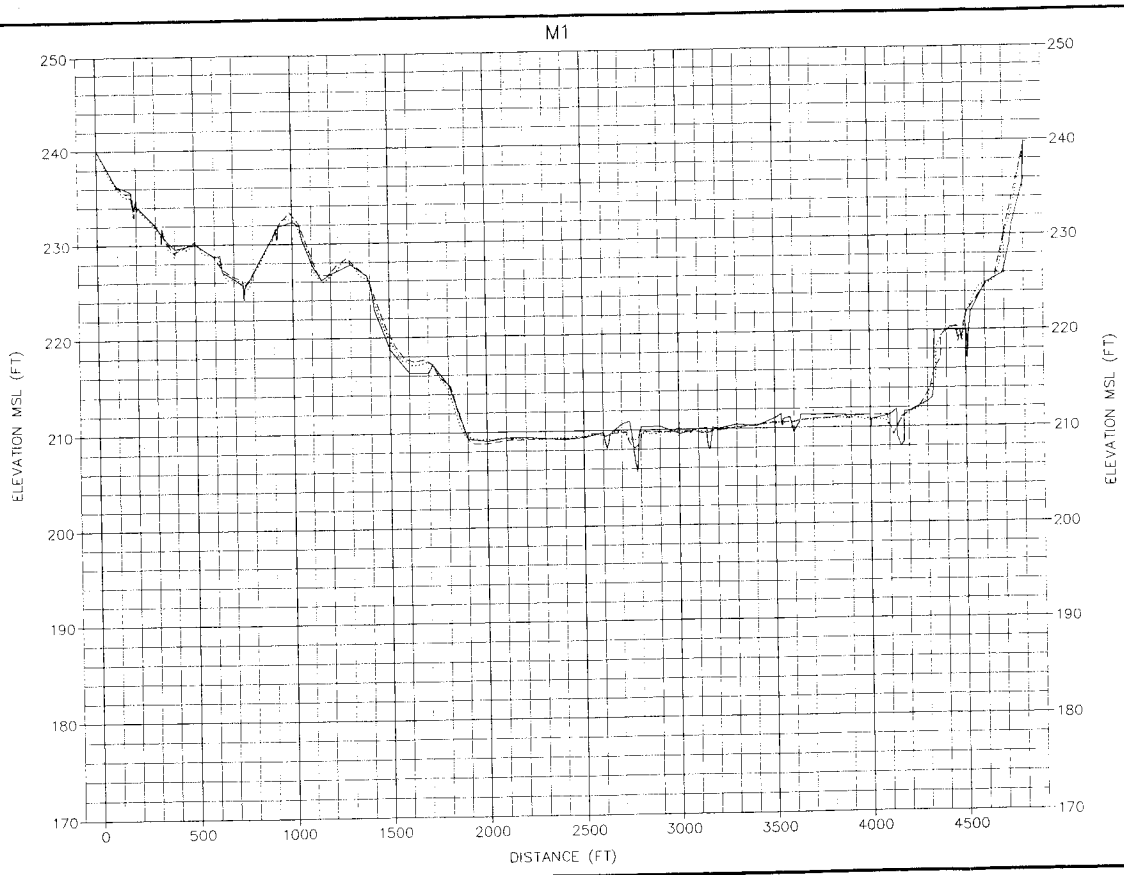
B. EVERETT JORDAN DAM & LAKE

CAPE FEAR RIVER BASIN

NORTH CAROLINA

SEDIMENTATION RANGES

CR1 & CR2

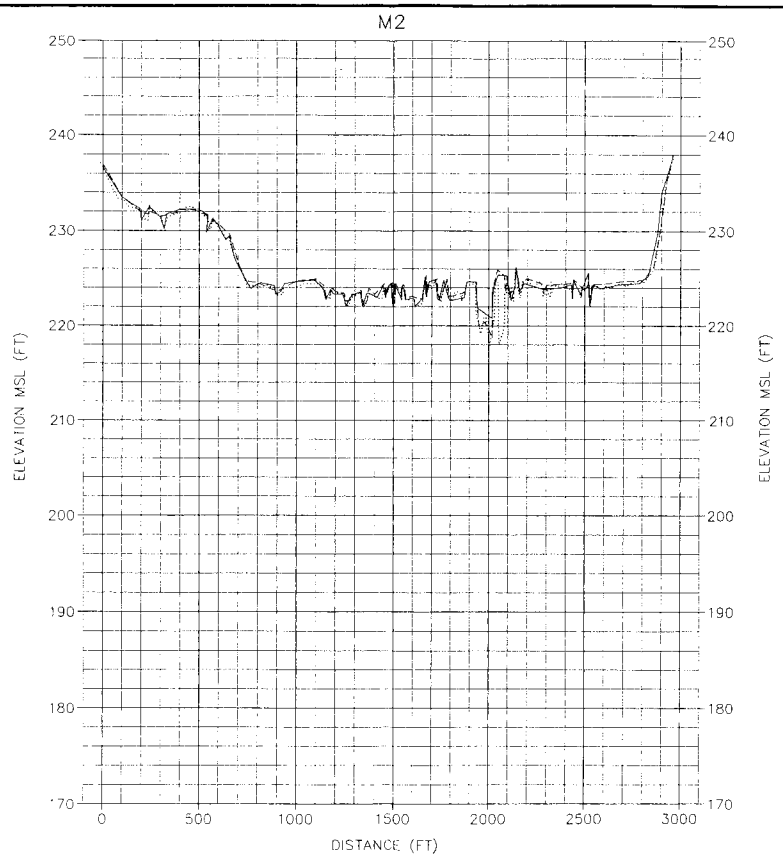


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
M1

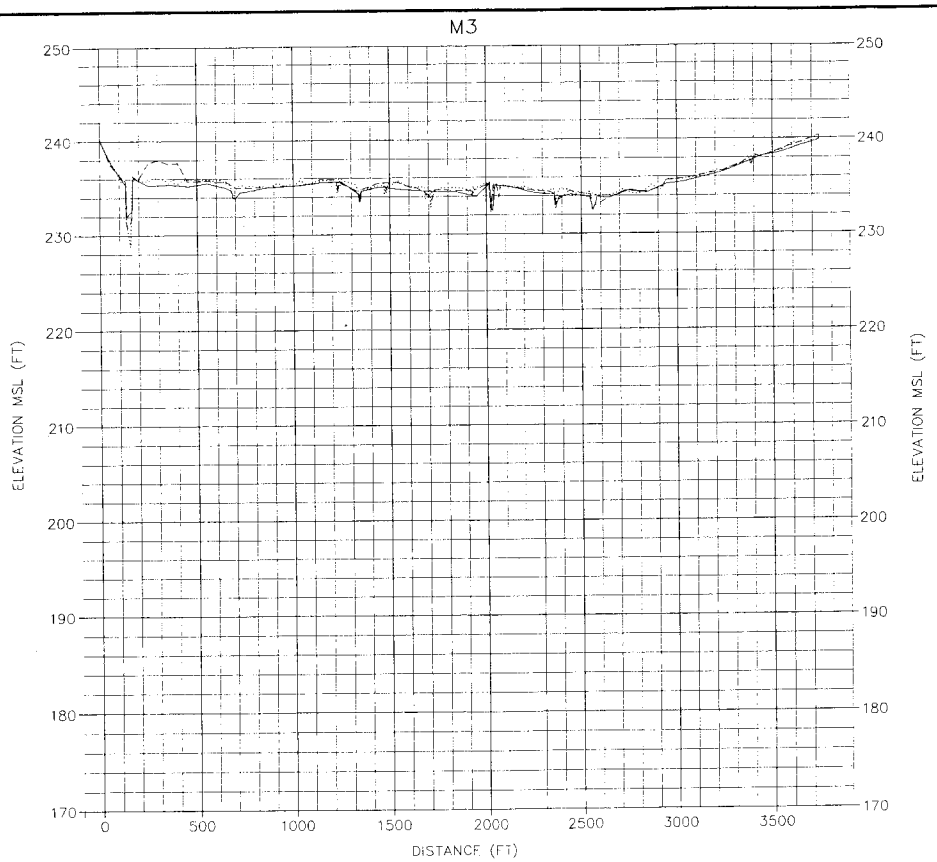


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
M2

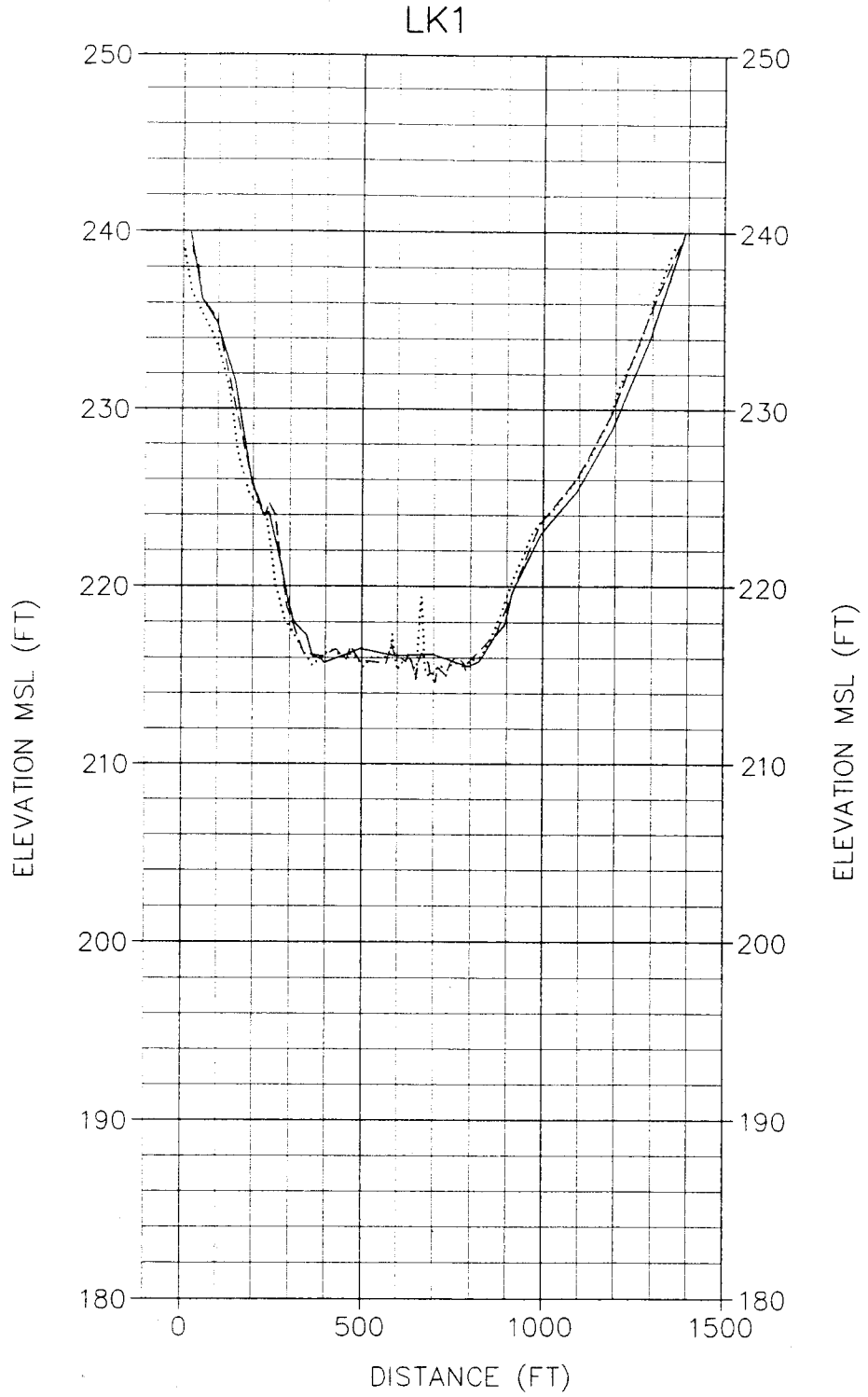


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGE
M3



LEGEND:

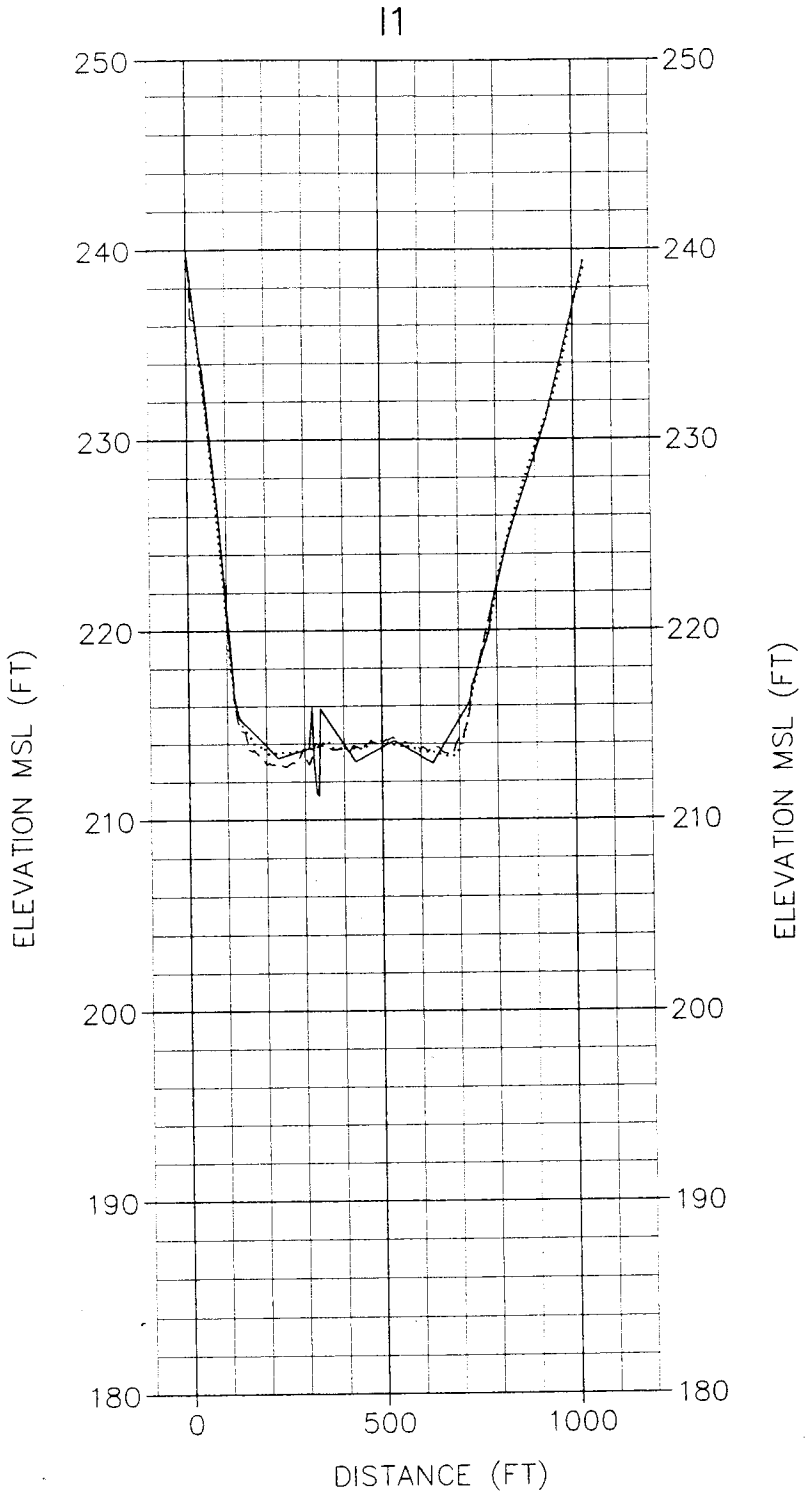
- 1997 SURVEY
- 1990 SURVEY
- 1979 SURVEY

SEDIMENTATION RANGE
LK1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA



LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

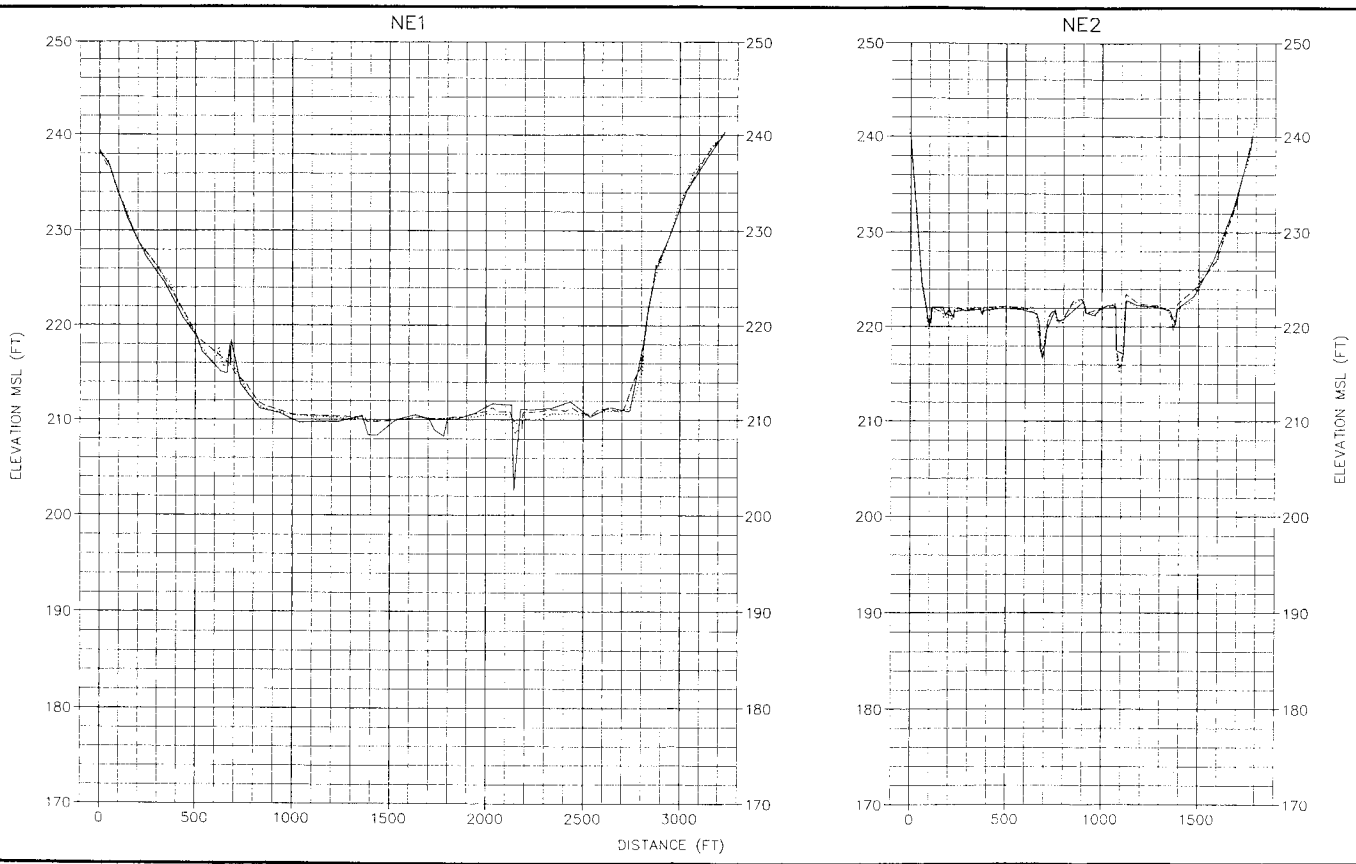
SEDIMENTATION RANGE

I1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

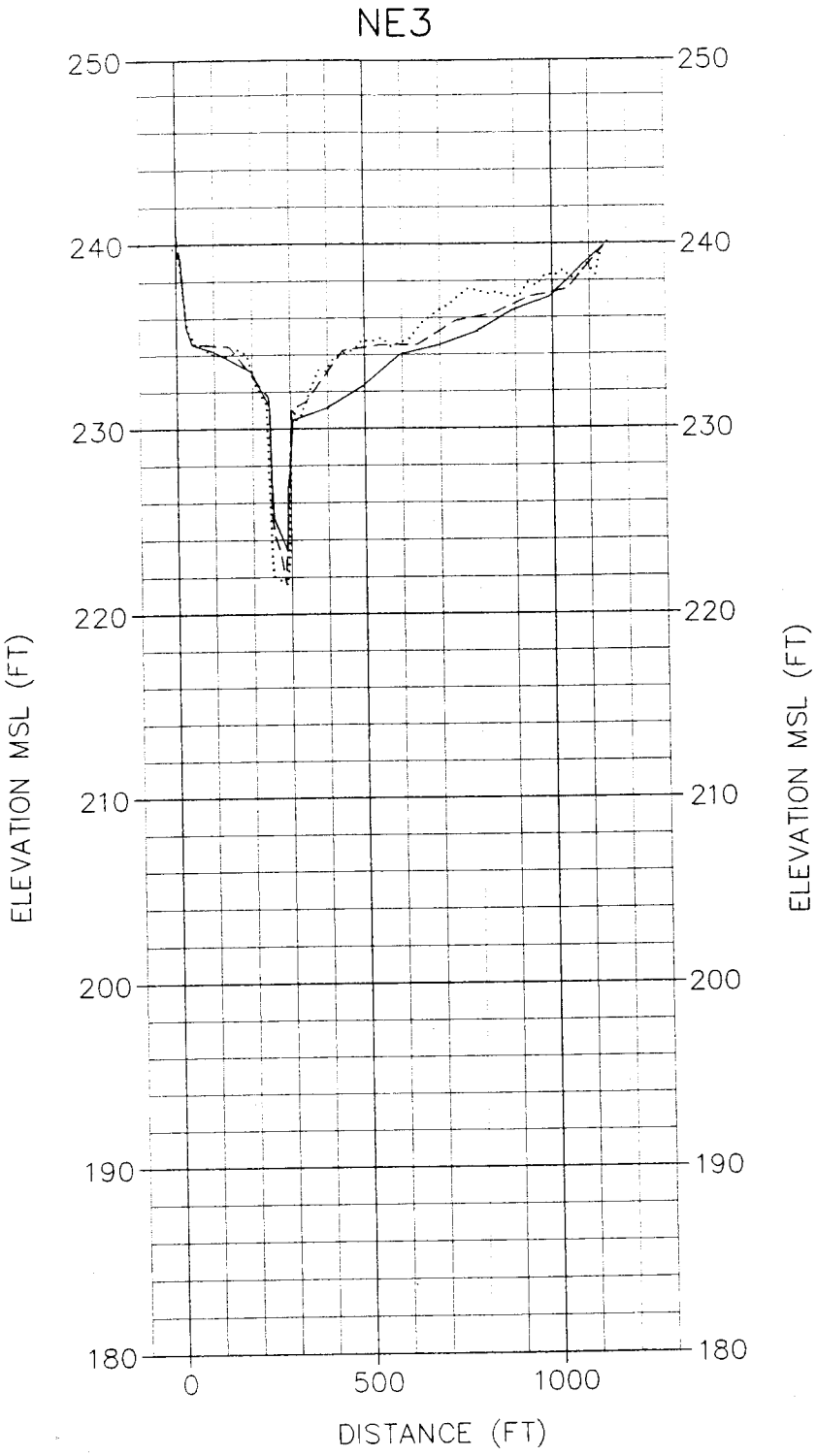


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
NE1 & NE2



LEGEND:

1997 SURVEY

1990 SURVEY

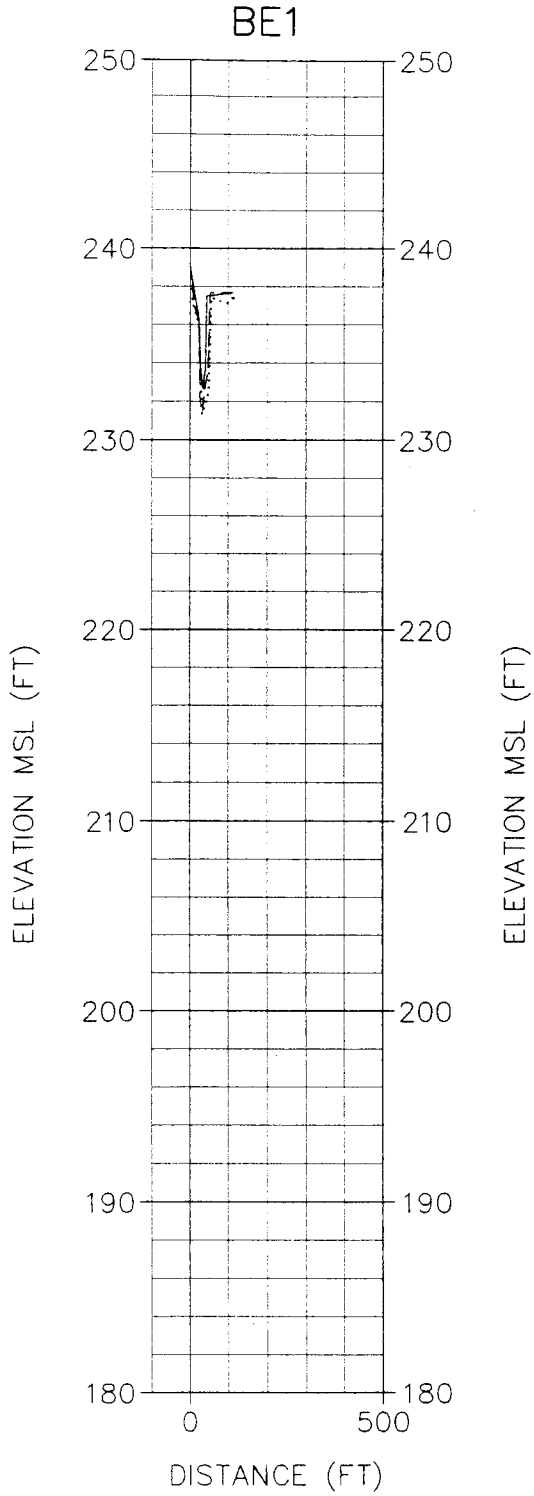
1979 SURVEY

SEDIMENTATION RANGE
NE3

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA



LEGEND:

1997 SURVEY

1990 SURVEY

1979 SURVEY

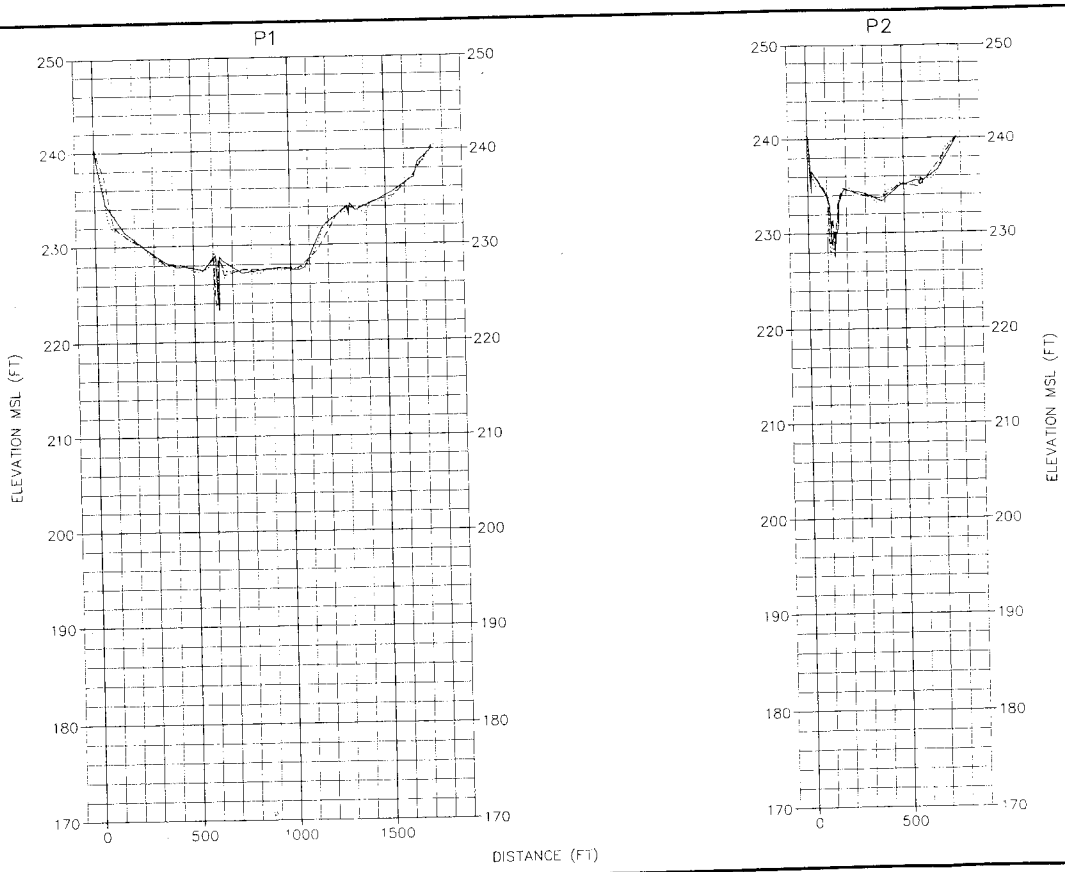
SEDIMENTATION RANGE

BE1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

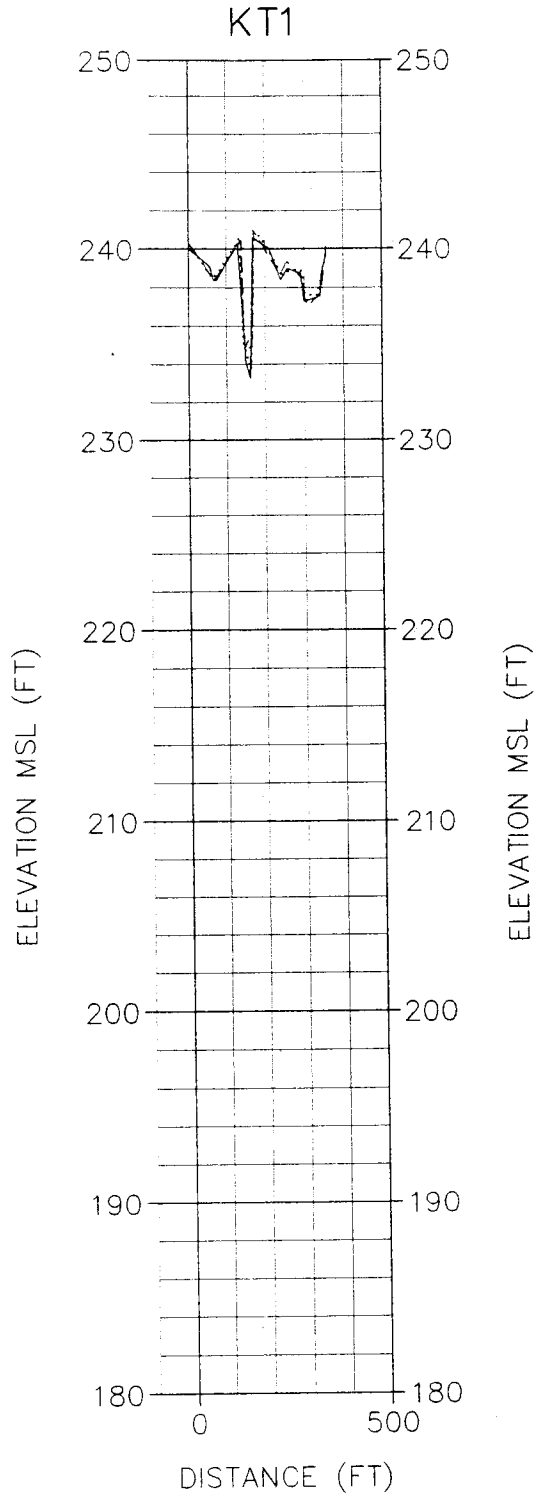


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
P1 & P2



LEGEND:

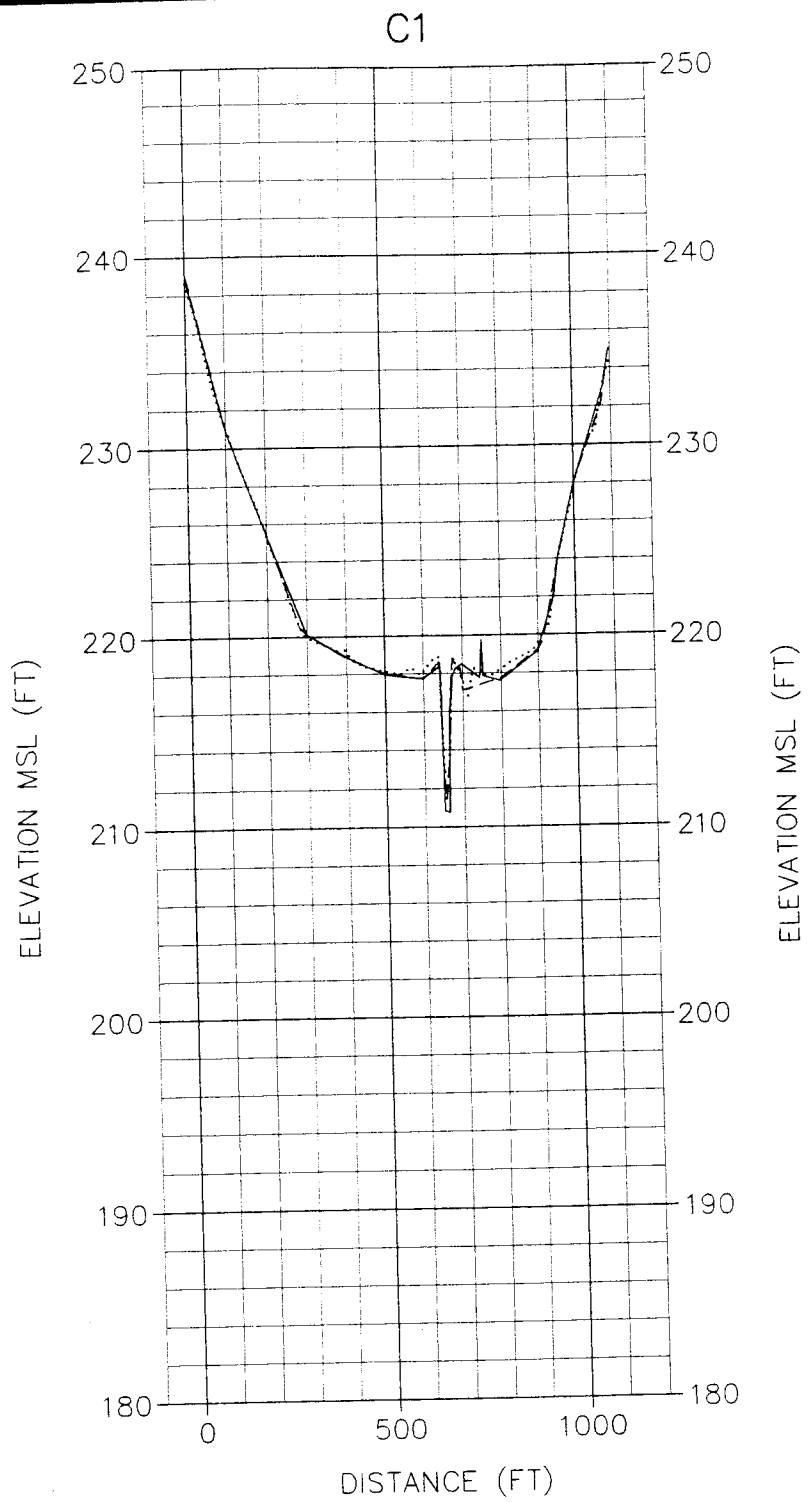
- 1997 SURVEY
- 1990 SURVEY
- 1979 SURVEY

SEDIMENTATION RANGE
KT1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA



LEGEND:

1997 SURVEY

1990 SURVEY

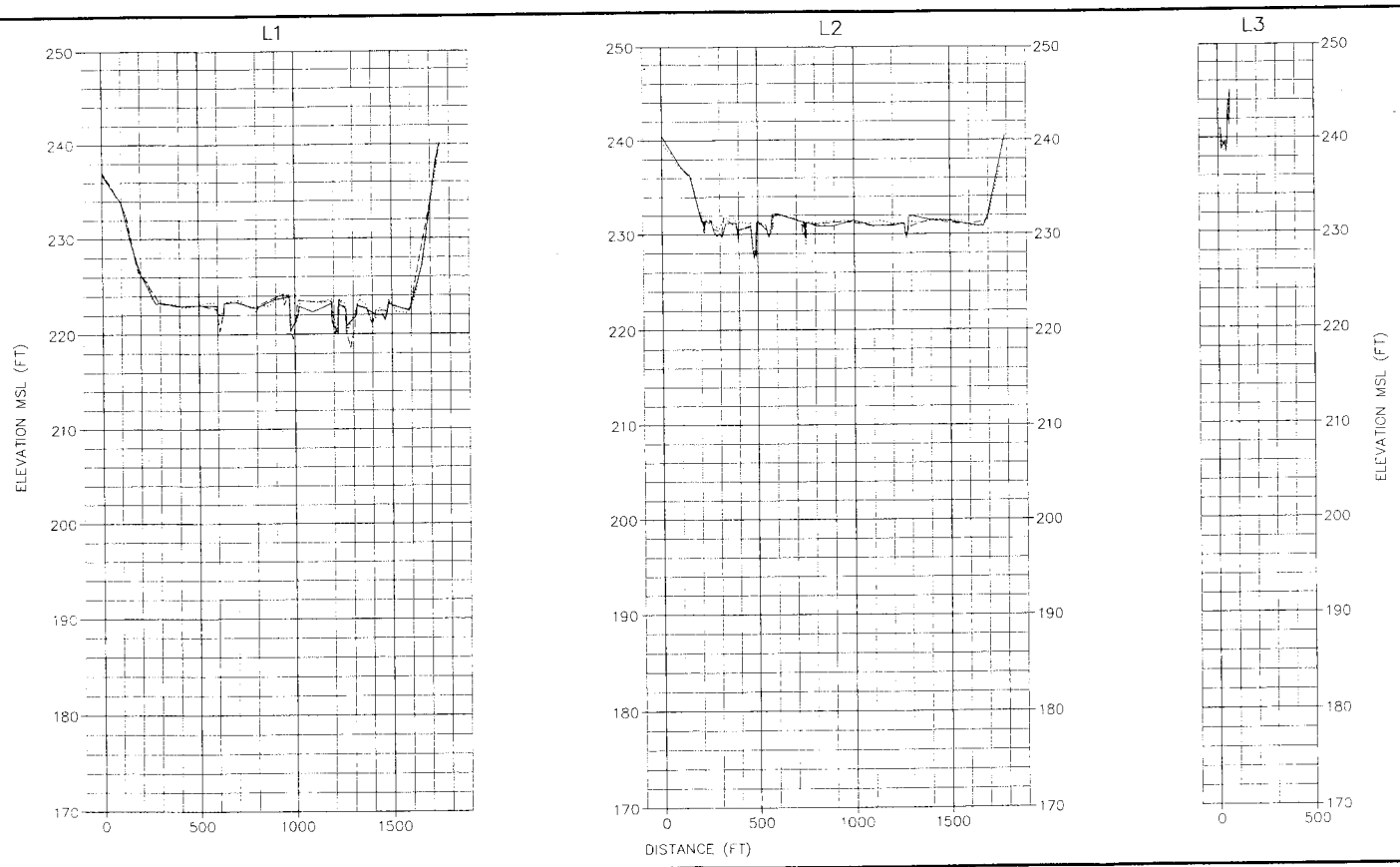
1979 SURVEY

SEDIMENTATION RANGE
C1

OCEAN SURVEYS, INC.

OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

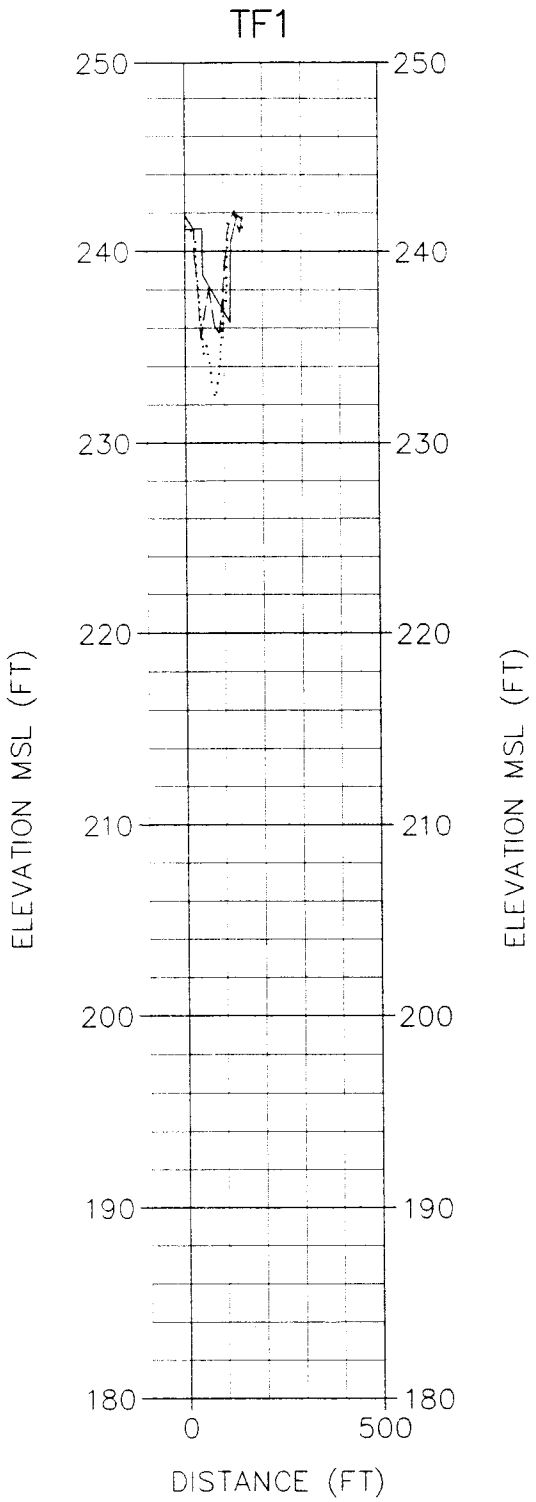


OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

LEGEND:
1997 SURVEY
1990 SURVEY
1979 SURVEY

B. EVERETT JORDAN DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

SEDIMENTATION RANGES
L1, L2, & L3



LEGEND:

- 1997 SURVEY
- 1990 SURVEY
- 1979 SURVEY

SEDIMENTATION RANGE
TF1

OCEAN SURVEYS, INC.
OLD SAYBROOK, CONNECTICUT

B. EVERETT JORDAN
DAM & LAKE
CAPE FEAR RIVER BASIN
NORTH CAROLINA

APPENDIX D

SEDIMENTATION RANGE BEARINGS AND MONUMENT POSITIONS

1997 RESURVEY MONUMENT COORDINATES (NAD 83)				
Range	**Monument**	**Elevation NGVD**	**Easting X**	**Northing Y**
H1C	A-reset	173.590	1,982,488.240	684,124.968
	B-reset	171.950	1,982,164.200	684,021.150
H2C	A	172.350	1,980,885.462	688,881.309
	B	170.610	1,980,578.615	688,813.626
H3C	A	171.850	1,980,574.105	691,476.330
	B	170.840	1,980,286.913	691,404.989
J1	A	241.670	1,980,520.168	694,739.473
	B	218.590	1,979,980.302	694,458.090
	C-reset	224.370	1,978,836.454	693,861.905
	D	242.460	1,978,717.688	693,800.003
H4	A	239.070	1,981,104.930	698,466.097
	B	218.180	1,980,920.391	698,386.490
	B1	222.490	1,978,798.352	697,458.962
	C	218.280	1,977,326.484	696,837.215
	D	236.430	1,977,169.472	696,770.890
H5	STAMPED D	240.590	1,975,060.963	709,428.063
	STAMPED C	218.710	1,975,142.120	709,437.424
	STAMPED B	219.450	1,976,089.899	709,548.713
	STAMPED A	238.460	1,976,165.829	709,557.616
H6	A	240.180	1,972,355.015	716,488.036
	B	218.510	1,972,251.463	716,457.046
	C	220.520	1,971,349.966	716,187.253
	D	240.230	1,971,220.260	716,148.436
H7	A	239.880	1,977,302.547	709,980.001
	B	216.930	1,977,684.563	709,549.116
	C1	227.110	1,978,339.176	708,810.593
	C	216.940	1,978,818.670	708,269.937
	D	238.730	1,979,312.469	707,713.151
K1	A	236.430	1,977,169.472	696,770.890
	B	222.240	1,977,254.164	696,608.374
	C-reset	223.520	1,978,646.620	693,936.376
	D	242.460	1,978,717.688	693,800.003
K2	STAMPED D	240.360	1,973,665.738	688,487.901
	STAMPED C	219.870	1,973,459.404	688,865.459
	STAMPED B	220.250	1,973,282.990	689,188.269
	STAMPED A	240.580	1,973,196.334	689,346.837
SK1	A	239.340	1,974,942.267	707,992.478
	B-reset	221.660	1,974,978.613	707,799.501
	C	219.700	1,975,761.336	703,643.695
	D	239.320	1,975,789.159	703,495.972
SK2	A	236.450	1,970,223.612	701,915.168
	B	237.030	1,970,516.644	701,713.925
NH1	A	239.490	1,983,081.823	703,135.352
	B	219.130	1,982,922.734	703,220.579
	C	220.870	1,982,414.809	703,492.685
	D	239.320	1,982,376.773	703,513.061

1997 RESURVEY MONUMENT COORDINATES (NAD 83)				
Range	**Monument**	**Elevation NGVD**	**Easting X**	**Northing Y**
NH2	A	241.890	1,982,997.587	712,493.044
	B	221.750	1,984,844.250	710,758.607
	C	218.550	1,989,062.990	706,796.249
	D	238.980	1,989,317.860	706,556.868
NH3	A	239.990	1,994,608.856	717,596.803
	B	229.660	1,994,082.095	717,666.637
	C	216.730	1,986,864.605	718,623.474
	D	240.050	1,984,910.393	718,882.548
NH4	A	240.100	1,993,814.448	728,322.631
	B	220.010	1,993,201.564	728,222.312
	C	216.470	1,989,149.118	727,558.992
	D	240.420	1,988,584.482	727,466.570
NH5	A	240.040	1,994,923.822	735,779.401
	B	218.330	1,994,554.447	735,801.077
	C	217.090	1,988,707.816	736,144.178
	D	240.020	1,988,097.540	736,179.991
NH6	STAMPED D	239.990	1,998,869.207	742,542.898
	STAMPED C	217.630	1,998,614.977	743,071.022
	STAMPED B	223.700	1,996,747.769	746,949.855
	STAMPED A	238.510	1,996,719.294	747,009.008
NH7	A	237.080	2,002,724.757	751,528.904
	B	221.930	2,002,819.451	751,404.266
	C	218.140	2,004,700.839	748,927.944
	D	240.070	2,005,495.178	747,882.418
NH8	A	240.310	2,009,240.312	757,431.156
	B	225.970	2,008,487.769	757,264.204
	C	222.060	2,005,754.767	756,657.887
	D	241.080	2,005,642.210	756,632.916
NH9	A	239.820	2,007,674.010	774,192.549
	B	240.210	2,010,580.496	770,305.900
NH10	A	239.590	2,011,618.664	777,757.795
	B	240.230	2,008,986.396	776,390.544
NH11	A	244.680	2,011,608.998	786,382.056
	B	239.920	2,007,657.094	785,920.712
NH12	A	240.190	2,009,019.749	791,907.740
	B	240.860	2,007,723.719	791,913.295
B1	A	239.590	1,993,637.510	711,141.967
	B	217.680	1,993,439.716	710,620.350
	C	217.500	1,992,794.520	708,918.469
	D	237.198	1,992,729.184	708,746.128
B2	A	239.950	1,998,081.090	711,872.769
	B	217.820	1,998,336.775	711,547.503
	C-reset	222.270	1,999,211.648	710,434.548
	D	240.090	1,999,328.150	710,286.342

1997 RESURVEY MONUMENT COORDINATES (NAD 83)				
Range	**Monument**	**Elevation NGVD**	**Easting X**	**Northing Y**
B3	A	238.310	2,004,449.765	715,260.273
	B	217.370	2,004,961.953	715,149.272
	C	218.910	2,005,482.704	715,036.359
	D	240.470	2,005,718.748	714,985.191
B4	A	239.930	2,005,677.336	714,139.080
	B	217.020	2,005,868.640	714,011.311
	C	217.740	2,008,135.135	712,497.554
	D	240.040	2,008,650.267	712,153.461
B5	A	239.550	2,017,010.949	718,987.010
	B	239.780	2,017,254.507	716,649.341
W1	A	240.500	1,993,068.591	707,009.104
	B	226.110	1,993,597.891	707,059.350
	C	220.130	1,995,021.511	707,194.492
	D	238.980	1,995,353.598	707,226.017
LB1	A	237.940	2,001,896.201	707,479.474
	B	217.240	2,001,735.824	707,190.826
	C	217.180	2,000,938.838	705,757.270
	D	241.220	2,000,664.028	705,263.297
LB2	A	240.420	2,008,242.725	705,143.006
	B	240.450	2,006,805.161	702,587.942
WO1	A	241.560	1,995,157.296	727,589.460
	B	227.450	1,995,186.055	727,558.536
	C	228.160	1,997,554.534	725,011.992
	D	240.420	1,998,074.014	724,453.193
WO2	A	240.050	2,006,348.016	730,022.434
	B	218.560	2,006,255.422	729,569.185
	C	225.550	2,006,089.633	728,757.653
	D	239.800	2,006,079.103	728,706.108
WO3	A	239.990	2,014,909.449	730,984.109
	B	240.000	2,015,178.520	729,030.901
WO4	A	243.320	2,023,583.060	731,504.160
	B	243.990	2,023,675.670	731,479.662
BU1	A	240.190	1,994,438.096	747,462.206
	B	222.960	1,994,266.175	747,419.691
	C	218.780	1,992,928.884	747,088.989
	D	240.160	1,992,396.928	746,957.440
BU2	A	241.290	1,991,344.620	752,881.434
	B	217.110	1,991,302.086	752,564.263
	C	218.760	1,991,193.375	751,753.661
	D	242.030	1,991,165.565	751,546.856
BU3	A	239.910	1,986,936.644	750,585.316
	B	240.190	1,987,328.409	749,728.569

1997 RESURVEY MONUMENT COORDINATES (NAD 83)				
Range	**Monument**	**Elevation NGVD**	**Easting X**	**Northing Y**
LK1	A	241.880	2,007,087.293	748,275.516
	B	217.210	2,006,567.970	748,109.281
	C	217.260	2,006,073.942	747,951.306
	D	239.920	2,005,762.344	747,851.401
I1	A	239.390	2,008,470.385	751,814.008
	B	217.040	2,008,345.432	751,545.570
	C	220.500	2,008,071.238	750,978.205
	D	240.040	2,008,027.312	750,886.225
NE1	B-reset	221.300	2,009,235.381	757,026.156
	C	219.090	2,009,205.171	754,708.466
	D	238.330	2,009,198.581	754,197.849
NE2	A	240.000	2,017,153.944	762,246.143
	B	239.950	2,015,397.567	762,513.268
NE3	A	239.880	2,021,143.534	768,786.428
	B	240.570	2,021,604.803	767,743.061
BE1	A	237.680	2,026,401.609	772,752.418
	B	238.200	2,026,400.576	772,640.548
KT1	A	240.100	2,025,336.976	766,006.795
	B	240.310	2,025,007.296	765,873.711
P1	A	240.380	2,019,585.335	758,141.010
	B	240.410	2,018,212.540	757,068.581
P2	A	240.180	2,021,016.190	757,245.618
	B	240.410	2,020,875.643	756,478.599
CR1	A	239.570	1,997,527.338	758,434.090
	B	243.340	1,997,541.345	756,260.059
CR2	A	239.950	1,990,971.331	762,715.486
	B	240.110	1,991,294.163	762,954.632
C1	A	235.000	2,008,729.852	765,086.413
	B	239.080	2,009,185.333	764,090.086
M1	A	240.040	2,002,732.591	756,692.138
	B	217.040	2,001,120.590	757,295.785
	C	220.010	1,998,639.886	758,225.418
	D	239.820	1,998,231.326	758,378.480
M2	A	236.880	1,999,111.352	769,194.580
	B	238.000	1,996,561.710	767,693.619
M3	A	240.220	1,994,748.355	776,194.271
	B	240.210	1,998,200.147	774,759.205
L1	A	237.120	2,005,837.517	777,833.379
	B	240.120	2,004,670.155	776,529.923
L2	A	240.510	2,002,815.066	782,781.144
	B	240.480	2,001,233.762	781,946.359
L3	A	240.890	1,996,493.923	789,005.896
	B	245.020	1,996,517.197	788,948.409
TF1	A-reset	241.810	2,013,442.892	789,282.782
	B-reset	241.790	2,013,324.349	789,371.691

SEDIMENTATION RANGE LINE BEARINGS

Sedimentation Range Line	Direction of Line				
H1C	S	72	14	07	W
H2C	S	77	33	40	W
H3C	S	76	02	59	W
J1	S	62	28	16	W
H4	S	66	41	45	W
H5	N	83	18	44	E
H6	S	73	20	21	W
H7	S	41	33	43	E
K1	S	27	31	31	E
K2	N	28	39	23	W
SK1	S	10	39	59	E
SK2	S	55	31	13	E
NH1	N	61	49	16	W
NH2	S	46	47	42	E
NH3	N	82	26	54	W
NH4	S	80	42	15	W
NH5	N	86	38	30	W
NH6	N	25	42	19	W
NH7	S	37	13	33	E
NH8	S	77	29	29	W
NH9	S	36	47	23	E
NH10	S	62	33	06	W
NH11	S	83	20	29	W
NH12	N	89	45	16	W
B1	S	20	45	47	W
B2	S	38	10	13	E
B3	S	77	46	09	E
B4	S	56	15	40	E
B5	S	5	56	53	E

Sedimentation Range Line	Direction of Line				
W1	N	84	34	38	E
LB1	S	29	04	25	W
LB2	S	29	21	49	W
WO1	S	42	55	22	E
WO2	S	11	32	46	W
WO3	S	7	50	37	E
WO4	S	75	10	59	E
BU1	S	76	06	35	W
BU2	S	7	38	29	W
BU3	S	24	34	24	E
LK1	S	72	15	01	W
I1	S	25	31	38	W
NE1	S	0	44	44	W
NE2	N	81	21	08	W
NE3	S	23	51	00	E
BE1	S	0	31	45	W
KT1	S	68	01	02	W
P1	S	52	00	11	W
P2	S	10	23	01	W
CR1	S	0	22	09	E
CR2	N	53	28	12	E
C1	S	24	34	05	E
M1	N	69	27	44	W
M2	S	59	30	54	W
M3	S	67	25	30	E
L1	S	41	50	50	W
L2	S	62	10	12	W
L3	S	22	02	26	E
TF1	N	53	07	47	W

APPENDIX E

EQUIPMENT SPECIFICATIONS

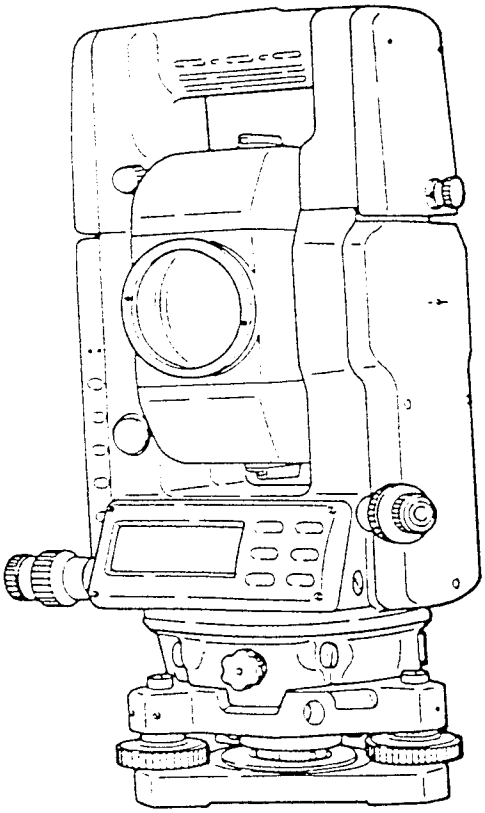
TOPCON

INSTRUCTION MANUAL

ELECTRONIC TOTAL STATION

GTS-300 SERIES

GTS-301D
GTS-302D
GTS-303D
GTS-303



20. SPECIFICATIONS

Telescope

Length	: 150 mm
Objective lens diameter	: 45 mm (EDM: 50 mm)
Magnification	: 30X
Image	: Erect
Field of view (at 1,000 m)	: 1°30'
Resolving power	: 2.5"
Minimum focusing distance	: 1.3 m
Reticule illumination	: Provided

Distance Measurements

Measuring range

		Atmospheric conditions	
		Condition 1	Condition 2
GTS-301D	1 prism	2,400 m (7,900 ft)	2,700 m (8,900 ft)
	3 prisms	3,100 m (10,200 ft)	3,600 m (11,800 ft)
	9 prisms	3,700 m (12,100 ft)	4,400 m (14,400 ft)
GTS-302D	1 prism	2,200 m (7,200 ft)	2,500 m (8,200 ft)
	3 prisms	2,900 m (9,500 ft)	3,300 m (10,800 ft)
	9 prisms	3,600 m (11,800 ft)	4,200 m (13,800 ft)
GTS-303D/303	1 prism	1,200 m (3,900 ft)	1,400 m (4,600 ft)
	3 prisms	2,000 m (6,600 ft)	2,200 m (7,200 ft)
	9 prisms	2,600 m (8,500 ft)	2,800 m (9,200 ft)

Condition 1: Slight haze with visibility about 20 km (12.5 miles) moderate sunlight with light heat shimmer.

Condition 2: No haze with visibility about 40 km (25 miles), overcast with no heat shimmer.

Measurement Accuracy	: ± (2 mm + 2 ppm) m.s.e.
Least Count in Measurement	
Single/Repeat measurement mode	: 1 mm (0.005 ft.)
Tracking/Coarse measurement mode	: 10 mm (0.02 ft.)/1 mm(0.005feet)
Measurement Display	: 9 digits max. display 999999.999 m
Measurement Time	
Repeat measurement mode	: 2.5 sec. (initial 4.0 sec.)
Tracking/Coarse measurement mode	: 0.5 sec. (initial 3.0 sec.)
Atmospheric Correction Range	: -99 ppm to +99 ppm, in 1 ppm increments
Prism Constant Correction Range	: -99 mm to +99 mm, in 1 mm increments
Conversion Factor	: Meter/Feet U.S. Survey Foot : 3.280833333333333 International Foot : 3.280839895013123
Ambient Temperature Range	: − 20°C to + 50° (− 4°F to + 122°F)

Electronic Angle Measurement

Method	: Incremental reading		
Detecting			
Horizontal	: 2 sides		
Vertical	: 2 sides		
	GTS-301D	GTS-302D	GTS-303D/303
Minimum reading	: 1"/5" (0.2 mgon/ 1 mgon)	1"/5" (0.2 mgon/ 1 mgon)	5"/10" (0.5 mgon/ 1 mgon)
Accuracy (standard deviation based on DIN 18723)	: 2" (0.6 mgon)	3" (1 mgon)	5" (1.5 mgon)
Measuring time	: Less than 0.3 sec.		
Diameter of circle	: 71 mm		
Tilt sensor			
Method	: Liquid type		
Compensating Range	: ±3'		
Minimum Reading	: 1" (0.2 mgon)		
Instrument height (Tilting axis above tribrack dish)	: 176 mm (0.577 ft.)		

Level Sensitivity

Circular level	: 10'/2 mm
Plate level	: 30"/2 mm

Optical Plummet Telescope

Image	: Erect
Magnification	: 3X
Focusing range	: 0.5 m to infinity
Field of View (at 1.3 m)	: 5°

Size

Instrument	
with Handle battery	: 346 x 190 x 150mm (13.62 x 7.48 x 6.91in)
without Handle battery	: 291 x 190 x 150mm (11.46 x 7.48 x 5.91in)
Weight	
Instrument (without Handle Battery)	: 5.2 kgs (11.5 lbs)
Plastic carrying case	: 3.7 kgs (8.2 lbs)

Handle Battery BT-24Q

Output voltage	: 7.2 V
Capacity	: 2.8 AH
Maximum operating time (when fully recharged) at +20°C (+68°F)	
Including distance measurement	: 6 hours
Angle measurement only	: 24 hours
Normal use	: 13.5 hours
(Calculated in the ratio of 1 (distance measurement)):3 (angle measurement)	
Weight	: 0.9 kgs (2.0 lbs)

Battery Charger BC-20B/20C

Input voltage	: AC 120 V/BC-20B, AC 230 V/BC-20C
Frequency	: 50/60 Hz
Recharging time (at +20°C/+68°F)	
Handle battery BT-24Q	: 1.5 hours
Operating temperature	: 10°C to 40°C (50°F to 104°F)
Charging signal	: Red lamp illumination
Weight	: 4 kgs (8.8 lbs)

- *Battery using time will vary depending on environmental conditions and operations done with GTS-300 series.*

Connection of external devices, i.e. Data collector, will also reduce the length of battery use.

4000RS™ & 4000DS™

DGPS Reference Surveyor and Differential Surveyor

The DGPS solution for real-time sub-meter accuracy utilizing L1 C/A code.

The 4000RS Reference Surveyor and 4000DS Differential Surveyor, built with Trimble's most advanced GPS processor, use carrier-smoothed C/A code measurements to achieve real-time DGPS sub-meter position accuracy. Both receivers feature 9-channels of continuous satellite tracking (12 channels optional), a lightweight, rugged, weatherproof housing, and low-power consumption for extended field operation time from batteries.

The 4000RS and 4000DS are ideal for hydrographic and navigation systems, vessel tracking and other dynamic surveying applications. The 4000RS operates as an autonomous reference station, calculating DGPS corrections in the RTCM SC-104 standard format for transmission to mobile GPS receivers. Advanced carrier aided filtering and smoothing techniques applied to exceptionally low noise C/A code measurements are used to provide the highest performance available in GPS positioning.

The 4000DS is designed to use DGPS corrections in the RTCM SC-104 standard format broadcast by the 4000RS. The receiver applies the DGPS corrections to its precise C/A code measurements to generate real-time, sub-meter positions at up to a 2 Hz. rate — even under the most challenging operating conditions.

The 4000DS receiver's standard NMEA-0183 version 2 messages, navigation firmware, data and 1PPS outputs allow for optimal flexibility for system integration and interfacing with other instruments. The navigation functions enable waypoint-based route planning with displays for cross track error, steering indicator, and bearing and distance to next waypoint.

While operating, the 4000RS and 4000DS can output binary and ASCII data for archiving or post-mission analysis. In addition, the 4000RS can operate as a mobile receiver with the same features, functionality and options as the 4000DS. For optimum DGPS positioning, combine the receivers with any of Trimble's data communications systems and QA/QC firmware to ensure the integrity of positioning accuracy.

4000 RS™ & 4000 DS™

Differential GPS Reference Surveyor and Differential Surveyor

4000 RS Features

Autonomous operation; Filtered and carrier-smoothed RTCM differential corrections (versions 1.0 and 2.0); 0.5 second measurement rate; Data integrity provision; Data link flow control on RTCM port; Triple DC input; L1 geodetic antenna; 30m antenna cable; Automatic mode restoration after power-off; Dual RS-232 I/O ports for data recording; Low power; Lightweight; Portable; Environmentally protected; 1 PPS output; NMEA-0183 outputs; RTCM input and output; 1-year warranty.

4000 DS Features

Less than 1 meter accuracy with Trimble 4000RS; Real-time operation; 0.5 second measurement rate; Data integrity provision; Triple DC input; Compact dome antenna; 30m antenna cable; Automatic mode restoration after power off; Extra RS-232 I/O port for data recording; Low power; portable; Environmentally protected; 1 PPS output; Navigation firmware; NMEA-0183 outputs; Weighted least squares solution; RTCM input; 1-year warranty.

Options

- Firmware update service—4 years
- L1 carrier phase
- 12 channels
- Rack mount
- Event marker
- QA/QC firmware
- Internal memory for datalogging
- Extended hardware warranty
- 4 serial I/O ports

Optional Accessories

- L1 Geodetic antenna
- 30m antenna cable extension, with in-line amplifier
- Office support module: OSM or OSM II
- AC power adapter, 50/60 Hz, 120V or 240V
- Receiver transport case
- TRIMTALK Series radio links
- NavBeacon XL MSK receiver

Physical Characteristics

Size:	9.8"W x 11.0"D x 4.0"H (standard receiver) (24.8cm x 28.0cm x 10.2cm) 16.8"W x 16"D x 5.25"H (rack-mount receiver) (42.7cm x 40.6cm x 13.3cm)
Weight:	6 lbs. (2.7kg) standard receiver 15lbs. (6.8kg) rack-mount receiver 0.5 lbs. (0.2kg) compact dome antenna 5.7 lbs. (2.6kg) L1 geodetic antenna
Power:	Nominal 10.5 to 35 VDC, 7 watts
Operating temp:	-20°C to +55°C
Storage temp:	-30°C to +75°C
Humidity:	100%, fully sealed, buoyant (standard receiver) 95% non-condensing (rack-mount receiver)

Technical Specifications

4000 RS

Peudorange correction accuracy:	Typically less than 30cm RMS; Low multipath environment
Compatibility:	Corrections may be applied to all differential-equipped GPS receivers

4000 DS

Accuracy:	Typically less than 1m RMS; Assumes at least five satellites and PDOP less than 4
Compatibility:	Accepts RTCM SC-104 corrections Version 1.0 or 2.0

4000 RS and 4000 DS

Tracking:	9 channels of L1 C/A
Start-up time:	Less than 2 minutes from power-on to tracking
Antenna:	External antenna with 30m RG215 cable
RS-232 data link rates:	50-57.6K baud
RTCM message output:	Types 1, 2, 3, 6, 9, 16
NMEA-0183:	ALM, BWC, GGA, GLL, GSA, GSV, RMB, RMC, VTG, WPL, XTE, ZDA
Ports:	Dual serial; Triple power inputs; Antenna; and 1PPS output
Display:	Backlit LCD with four lines of forty alphanumeric characters; Large, easy-to-read characters—2.8mm x 4.9mm; Total viewing area: 32cm²; Adjustable backlight and viewing angle
Keyboard:	Alphanumeric, function, and softkey entry

Specifications subject to change without prior notice.

Trimble

Surveying & Mapping Products
645 North Mary Avenue
Post Office Box 3642
Sunnyvale, CA 94088-3642
(408) 481-8000
FAX: 408-481-7744

Trimble Navigation Europe, Ltd.
Trimble House, Meridian Office Park
Osborn Way, Hook
Hampshire, RG27 9Hx, England
+44 256-760150
FAX: +44 256-760148

Trimble Navigation Singapore
15 Scotts Road
#03-01 Thong Teck Building
Singapore 0922
+65 738-6549
FAX: +65 738-6346

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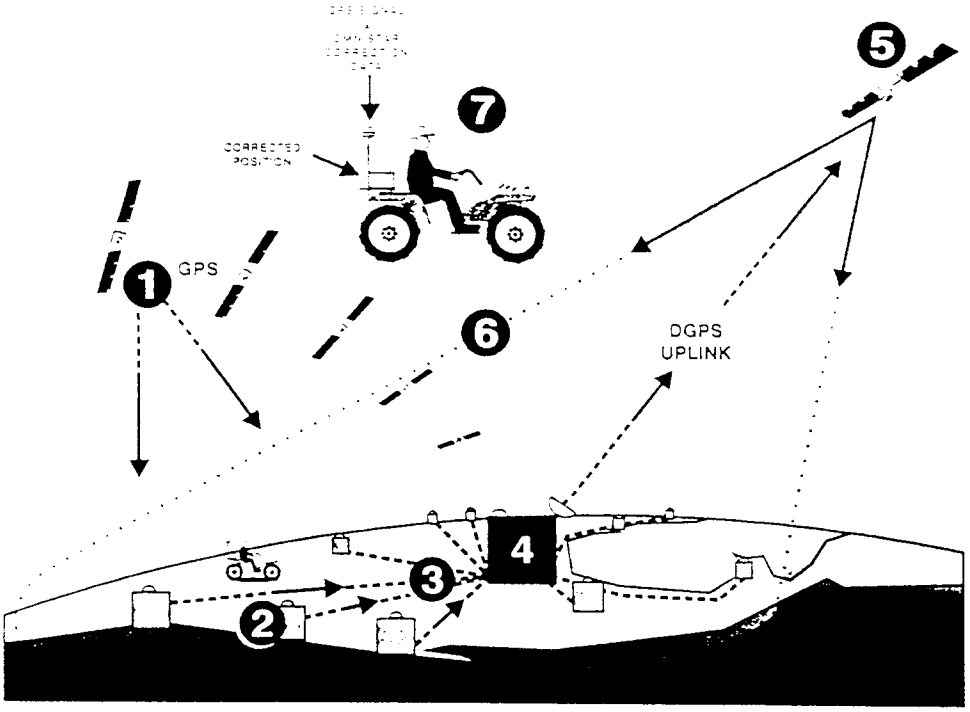
FUGRO

OMNISTAR™ 7000 DGPS



OMNISTAR's unique "Virtual Base Station" technology generates corrections optimized for user's location. OMNISTAR™ receivers output both high quality RTCM-SC104 Version2 corrections and differentially corrected Lat/Long in NMEA format. See specs for additional output information.

OMNISTAR™ North American Coverage

OMNISTAR™ backpack configuration with palm top and OMNILOG software.

How it works...

1. GPS satellites 2. Multiple OMNISTAR™ GPS monitor sites 3. Send GPS corrections via lease line to 4. Houston Network Control Center where data corrections are checked and repackaged for uplink to 5. GE Spacenet 3 geostationary C-band satellite 6. GE Spacenet 3 broadcast footprint = OMNISTAR™ user area 7. Correction data are received and applied real-time

OMNISTAR™ is a real-time, wide area differential GPS service providing precise positioning throughout the continental U.S. and much of Canada and Mexico.

Direct broadcast from OMNISTAR's geostationary satellite transponder overcomes the coverage limitations of ground based reference stations.

OMNISTAR™ 7000 Standard Features

The OMNISTAR™ 7000 is a compact, robust position sensor designed specially for OEM's. Each 7000 unit contains a GPS Engine *plus* Satellite Differential Receiver *plus* Antennas.

The 7000 readily integrates into today's GIS and Precision Agriculture sytems. A single cable is used for power and position data.

The precise real-time positioning data is obtained from OMNISTAR's nationwide direct satellite broadcast system using our proven multi-site solution.

APPLICATIONS

★ Survey/Mapping

★ Yield Monitoring

★ Soil Sampling

★ Chemical Application

★ Resource Management

★ GIS/Utilities

★ Vehicle Location

★ Environmental

OMNISTAR

Model 7000 Specifications

OMNISTAR 7000
General Specifications

Frequency:	Spread Spectrum C - Band (3750/4250 MHZ)
Acquisition:	Cold start <2.5 minutes 90% Warm start <90 seconds 90%
Reacquisition	<10 second with 5 second outage
Outputs:	1. RTCM-SC104 Version 2 2. NMEA sentences: GGA, GSA and RMC every second, others on request
Protocol:	4800.n.8.1

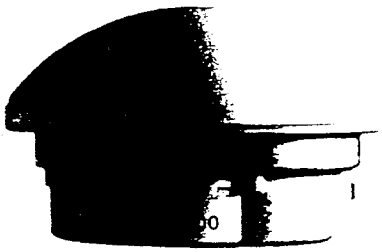
Receiver

Operating Temp:	-20 to +70 degrees centigrade
Storage Temp:	-55 to +105 degrees centigrade
Humidity:	95% R.H. @ +30 to +70 degrees centigrade
Shock:	25 g's for 5 m's duration

GPS

Integral GPS Engine:	Motorola Oncore 8 channel

Accuracy: Dependent on the GPS receiver, satellite geometry and local conditions. Nominal accuracy is 1 to 3 meters (1 sigma horizontal).



Physical Characteristics

Power:	12 volts DC
Power Consumption:	10 watts (860 ma @ 12 volts
I/O Ports:	Two RS232 tx, One full RS232 port (tx/rx) One CAN Bus (Version 2.0B compatible)
Weight:	2 lbs. 12 oz.
Connector:	Packard 10 pin automotive connector (Supplied)
Dimensions:	Cylindrical 7.5 inches in diameter 4.5 inches in height

All specifications are subject to change without notice

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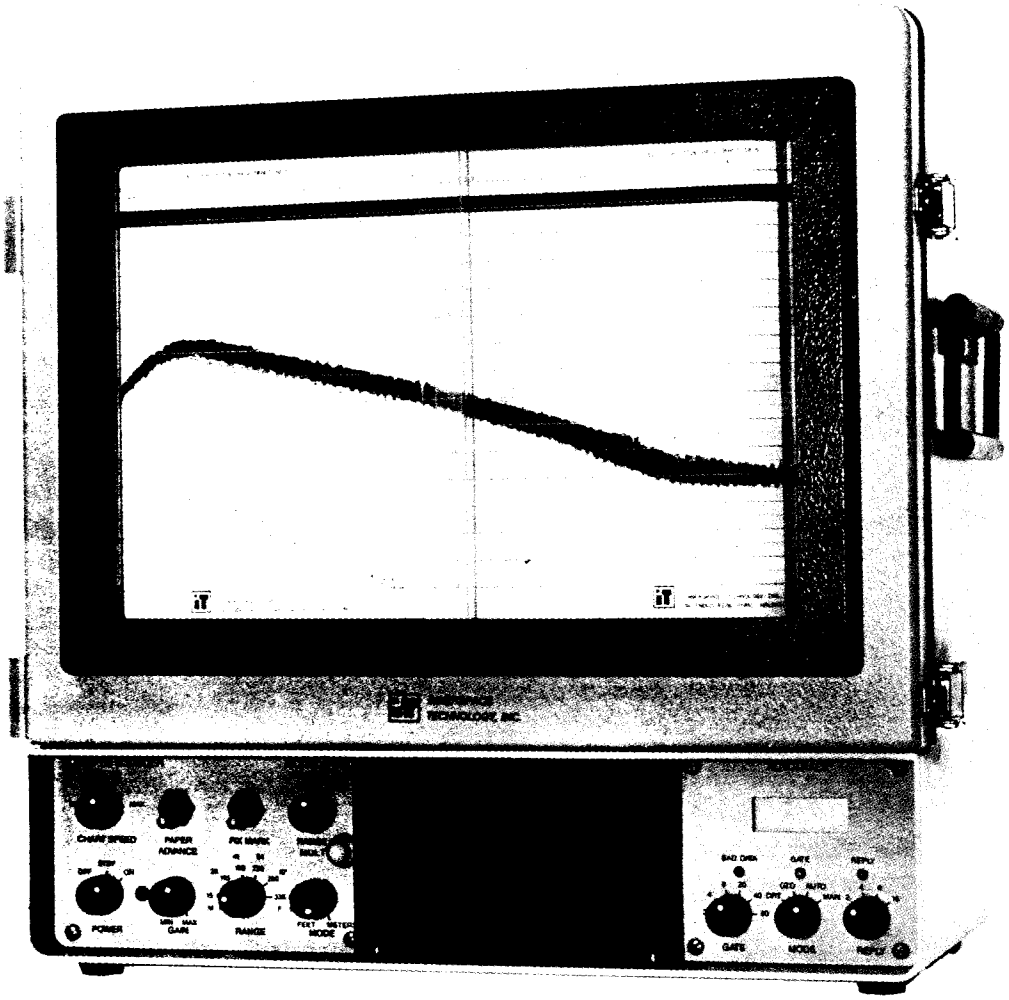
OMNISTAR, INC.
8200 Westglen, Houston, Texas 77063
Phone (713) 785-5850 Fax: (713) 785-5164
www.omnistar.com email dgps@omnistar.com

INNERSPACE

THERMAL DEPTH SOUNDER RECORDER
MODEL 448



DESCRIPTION

The Innerspace Technology Model 448 Thermal Depth Sounder Recorder provides survey precision, high resolution depth recordings using SOLID STATE THERMAL PRINTING. The lightweight, portable unit is designed for use in small boat surveying as required for nautical chart production, engineering surveys, harbor and channel maintenance, pre and post dredge surveys, etc. The Model 448 TDSR uses a thermal printing technique pioneered by Innerspace for depth sounding which provides the high resolution and accuracy required by groups such as the U.S. Army Corps of Engineers, dredging companies, survey companies, port administrations, etc. The state of the art design allows integration into portable hydrographic survey systems.

INNERSPACE TECHNOLOGY, INC.

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DIGITIZER OUTPUT	In addition to the built in depth digitizer, Start/Stop pulses are available for use with external digitizers such as Innerspace Models 410, 412 and 445.
POWER	Either 12, 24 V DC or 120, 240 V AC (Must be specified AC or DC)
DIMENSIONS	17 in. W x 17¼ in. H x 9¼ in. D
WEIGHT	45 pounds
ENCLOSURE	Coated aluminum, corrosion resistant and splashproof. Sliding window for chart access and settings door for easy access to thumbwheel switches.

SPECIFICATIONS—INTERNAL MICROPROCESSOR DIGITIZER

OPERATING MODES	Either a DIRECT, GATED, AUTO or MANUAL mode may be chosen DIRECT — No gate present GATED — Gate width doubles, then quadruples automatically to reacquire the bottom reply AUTO — Gate width doubles, quadruples then goes to non-gated automatically to reacquire the bottom reply MANUAL — Fixed gate as preset on initial depth thumbwheel
GATE WIDTH	Selectable 2, 4, 8, 20, 40 or 80 via rotary switch. Gate width in feet or meters, determined by the recorder MODE switch setting
MISSED REPLIES	REPLY switch selects 2, 4, 8 or 16 missed replies, before reacquisition of bottom reply, in AUTO mode.
DISPLAY	Four digit LCD 7 segment. Resolution to 0.1 feet or meters, determined by the recorder MODE switch setting.
INDICATORS	Three LED's representing BAD DATA, REPLY and depth GATE
INITIAL DEPTH	Three station thumbwheel switch allows entry of an initial depth gate position
ALARM	A switched audible alarm indicates loss of track
OUTPUTS	BCD—8421 TTL compatible 5V positive logic. Buffered outputs with data hold, inhibit, strobe and flag lines. IEEE488 GPIB—4 digits with proper protocol and selectable address switches (optional) EIA RS232C—4 digits with selectable baud rates (optional). A bad data flag is available and can optionally set the output number to all zeros.

INNERSPACE TECHNOLOGY, INC.

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