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Paul C. Kendall
Virginia Institute of Marine Science

Dexter S. Haven
Virginia Institute of Marine Science

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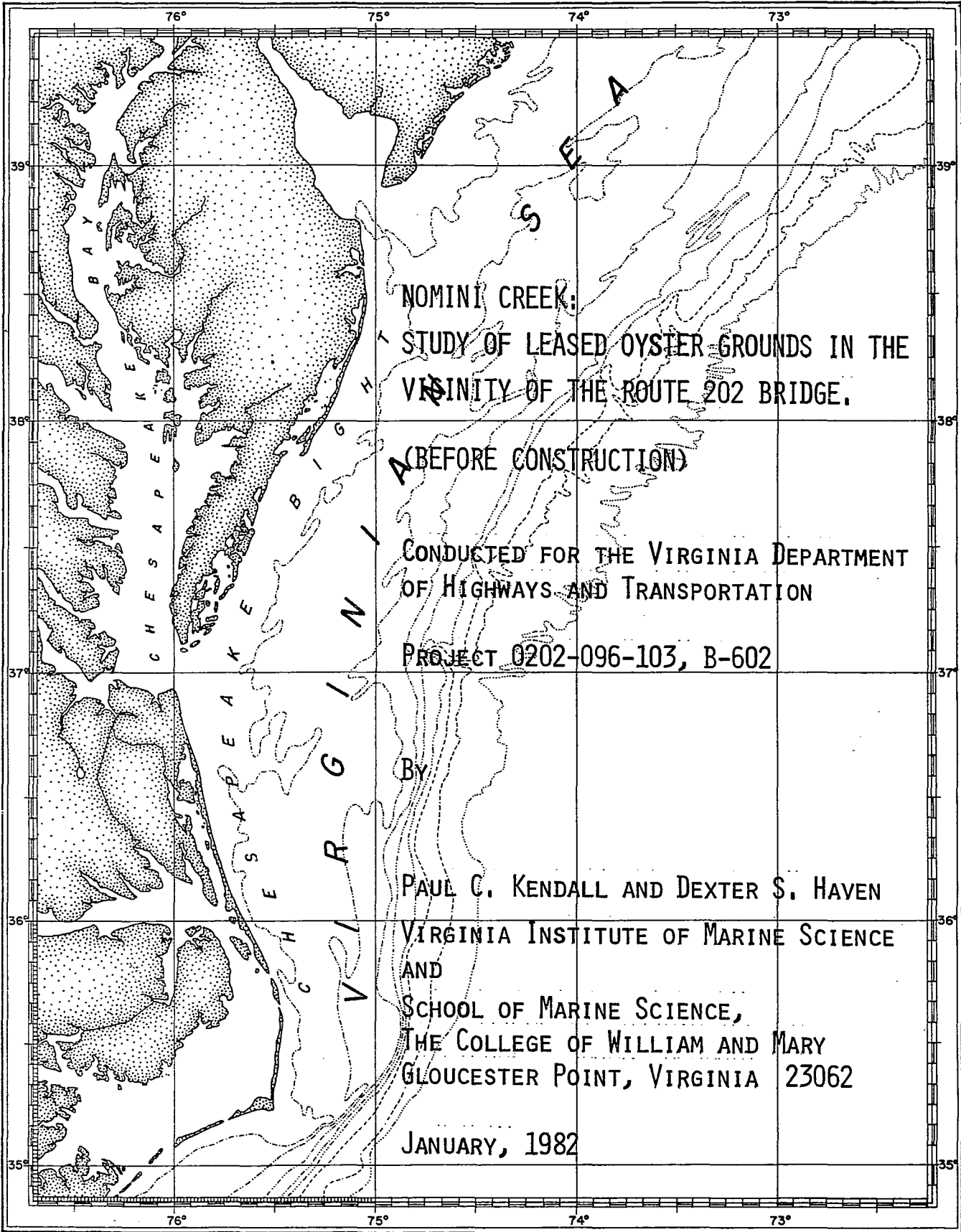


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NOMINI CREEK:
STUDY OF LEASED OYSTER GROUNDS IN THE
VICINITY OF THE ROUTE 202 BRIDGE.

(BEFORE CONSTRUCTION)

CONDUCTED FOR THE VIRGINIA DEPARTMENT
OF HIGHWAYS AND TRANSPORTATION

PROJECT 0202-096-103, B-602

BY

PAUL C. KENDALL AND DEXTER S. HAVEN
VIRGINIA INSTITUTE OF MARINE SCIENCE
AND
SCHOOL OF MARINE SCIENCE,
THE COLLEGE OF WILLIAM AND MARY
GLOUCESTER POINT, VIRGINIA 23062

JANUARY, 1982

INTRODUCTION

A study of leased oyster planting ground at the site of the proposed new bridge for Route 202 across Nomini Creek was made in December 1981 by the Virginia Institute of Marine Science. The work was done for the Virginia Department of Highways and Transportation, Project 0202-096-103, B-602.

Nomini Creek - A Review

Average surface salinities for the Potomac River at the mouth of Nomini Creek have been described as 13 parts per thousand (ppt) in the fall and about 6 ppt in the spring.¹ Salinities in the creek would be somewhat lower (1-2 ppt) and would decline with increasing distance upriver from the mouth of the creek.

Salinity records for the area studied (the bridge site) are not available. However, they could be marginal for oyster culture (5 ppt or lower) in spring based on our existing records.

A previous report by VIMS in 1980 stated: "According to an owner of Dean's Shucking House in Nomini Creek (1½ miles below the study area) the last set in this creek occurred in 1963. There has been no set of any consequence since that time... During the years when water milfoil abounded to the point of being a problem (1958-1963) a few oyster larvae would set on the stems of the plants along shore and a few would

¹1963. Stroup, E. D. and R. J. Lynn. Atlas of salinity and temperature distributions in Chesapeake Bay 1952-1961 and seasonal averages 1949-1961: Graphical Summary Report 2. Chesapeake Bay Institute. The Johns Hopkins University.

survive. Prior to this [local inhabitants report that] there was zero to no set except for the war years (1942-1946). The magnitude of set in this period was unknown. In the 1930's there was a good set during many years, but this observation can not be corroborated."²

From 1964 to 1972 no set or strike was noted by VIMS personnel in the study area. Even at the mouth of the Nomini Creek/Bay (Kingcopsico Point) only three spat in ten years have been noticed in VIMS' monitoring of oyster spat.

A restriction has been placed by the Virginia Department of Health on the harvest of any shellfish from the area studied.³ Shellfish may be harvested below the bridge only by permit of the Virginia Marine Resources Commission and only between April first and November first. They must then be carried to cleaner waters and relaid for a period of time which the State Health Commissioner considers is sufficient for depuration before being sent to market. The area above the bridge has been declared by the Health Department to be conditionally approved, meaning that shellfish may be harvested without restriction as long as bacteriological results are satisfactory; however, the area may be closed by the Health Commissioner without advance notice at any time that bacteriological results are unsatisfactory.

²1981. Haven, D. S., J. P. Whitcomb and P. C. Kendall. The Present and Potential Productivity of the Baylor Grounds in Virginia: Volume II. SRAMSOE #243. VIMS.

³1977. VA Dept. of Health. Notice and Description of Shellfish Area Condemnation Number 82, Nomini Creek.

METHODS

Locating Leased Grounds

Leases in the vicinity of the Route 202 bridge were identified from plats furnished by the Virginia Marine Resources Commission (VMRC), and the corners marked (staked) by VMRC and VDH&T personnel. Names of the lessees, acreage of the leases and number of locations (i.e., stations) and samples taken are shown in Table 1. The location of the leases and the locations sampled are shown on Figure 1. The surveyors also placed stakes 600 feet from the existing bridge both up-and downstream.

Sampling

It was originally planned to sample the bottom between the bridge and 600 feet on either side. This plan was modified slightly, and the zone upriver was enlarged to include 700 feet upstream of the bridge. This was done because the new bridge is to be located approximately 100 feet upstream of the existing bridge.

Leased portions within the study area were divided into 100 foot squares using reference stakes placed by VIMS personnel 1, 2, 3, 4, 5 and 6 hundred feet from the bridge (Figure 1).

After this VIMS personnel went to the approximate center of each square and collected two samples of the bottom substrate with oyster tongs. These tonged samples were collected by an experienced tonger with two different sets of tongs. One pair had shafts 12 feet long for use in shallow water; the second pair for use in deep water had shafts 16 feet long. The heads of the tongs were tied with rope to control the distance

of opening (and, therefore, the area of bottom covered in taking the sample).

The contents of each grab of the tongs was placed on the deck of the boat, and the following observations were made and recorded:

- Numbers and volumes of oysters and other commercially valuable shellfish;
- Volumes of shell material;
- Numbers of oyster boxes or cluckers (shells of dead oysters);
- Type of bottom; and,
- Vegetation.

Besides using the tongs to take two samples in every one hundred foot square a rigid pole was used to touch or probe the bottom at intervals of approximately 20 foot along the 100 foot transects parallel to the bridge. In this way the pole was used to characterize the bottom between the locations sampled with the tongs.

A recording fathometer was used to trace the profile of the bottom along nine transects (Figure 2).

Estimates of density and quantity were calculated based on the hand tong sample results and using the calculations shown in Table 2.

RESULTS AND DISCUSSION

The field work involved in this study was done on 30 November and 2, 3, 7 and 8 December 1981. The results of hand tong sampling are shown in detail in Table 3, 4, and 5 and are summarized here in the text. Tracings of the bottom by the fathometer are shown in the Appendix.

Conklin's Tracts

Tract I

On Tract I, downstream of the bridge, 70 tonged samples were taken at 35 locations over the entire 7.91 acre lease (Table 1). A soft mud bottom with no vegetation was found at all locations. The 6.8 quarts of shell found were almost all buried in the mud except for two small patches next to the western fender of the bridge; 50% and 30% of the shell found at these two locations was resting on the sediment surface. They sustained on their surface typical organisms for the area: mussels, blood worms, barnacle shells, and membranous brown worm tubes. No live oysters and no oyster boxes were found (Table 3). Probing the bottom with a rigid pole between the hand tong sample locations revealed a soft mud bottom and very little shell.

Approximately one quarter of the samples contained soft clams ranging in length from 13 millimeters ($\approx \frac{1}{2}$ inch) to 35 mm ($\approx 1\frac{3}{8}$ inch); the numbers of clams ranged from 1 to 6 per sample. A few intact shells (boxes) and single valves of Rangia clams were found plus two live clams.

The fathometer was operated along transects IV, V, VI and VII (Figure 2). It revealed some roughness of the bottom, but nothing was seen that indicated oysters or shelly bottom (Appendix).

Tract II

On Tract II, upstream of the bridge, 94 tonged samples were taken at 48 locations in the 9.04 acres that were studied (Table 1). A soft mud bottom with no vegetation was found at all locations. Of the 11.9 quarts of shell collected, all were buried except for 3 shells located

at two stations near the western bridge fender. No live oysters or oyster boxes were found here. Associated organisms were the same as on Tract I. Probing the area with a rigid pole between the stations indicated nothing but a mud bottom.

Fathometer study of the bottom along transects I, II, III, VIII and IX (Figure 2) showed no roughness of the trace to indicate oysters or shell. The traces along the transects parallel to the bridge did show that the sides of the creek slope steeply to a depth of 14-15 feet at high tide (when the traces were made); there was a 2 foot high mound beside the channel to the east (Appendix, Transects I and II).

The proposed right-of-way lies over 2.13 acres of Tract II adjacent to the existing bridge (Table 1 and Figure 1). Twelve of the stations sampled with hand tongs and fathometer Transect I are in this area. Most of the shell found on this lease (10.7 out of 11.9 quarts) was found in this 2.13 acre area (Table 4).

Faunce's Leases

Lease Upstream

Thirty-six samples were taken with hand tongs at 19 locations on this 4.76 acre lease (Table 1). Shell was found at only three locations, and the entire 1.7 quarts was buried in the mud. No live oysters or oyster boxes were recovered. Several large Rangia clams were found here. The bottom was entirely soft mud; no vegetation was found. Probing the bottom at many locations between the stations with a rigid pole indicated a soft mud bottom and a rare shell (Table 5).

The fathometer record (Figure 2 and Appendix, Transects II and III) shows a generally even bottom and nothing to indicate that oysters or shells were present.

Lease Downstream

On 3.45 acres of this lease 26 samples were taken at 13 locations (Table 1). No live oysters or oyster boxes were found. The bottom was soft mud except for sand at one station along the shoreline; no vegetation was seen or taken by the tongs. Less than a quart (0.7 quart) of buried shell was found, and that came from two stations. No Rangia clams were found here. Observations from probing the bottom at locations between stations on the lease corroborated the occurrence of soft mud and the almost total absence of shell (Table 5).

A portion of one fathometer transect (Transect IV) crossed this lease (Figure 2). The fathometer revealed a smooth bottom.

SUMMARY

Value of Shell on the Various Leases

A small quantity of widely scattered shell was found buried in the soft mud bottom. Negligible quantities of surface shell were found. The very small quantity and condition (buried) of these shells make them almost worthless for oyster culture. However, the estimated quantities and values have been calculated and are shown in Table 6; the values are considered to be generous.

It appears, on the basis of the scarcity of shells and oysters that the study area has not recently been used extensively for oyster

culture. Additionally, the area around the Route 202 bridge is generally not desirable for oyster culture for the following four reasons:

1. Its location in an area where environmental conditions are marginal for oyster growth;
2. The restrictions placed on harvesting by the Virginia Health Department;
3. The soft bottom substrate which would not support oysters without "shelling" the bottom so it would support oysters; and,
4. The low rates or absence of natural set (no evidence of past sets was seen on hard objects such as the bridgepilings) which means that oysters would have to be planted there if the area was to be made productive.

CONCLUSION

The proposed right-of-way 2.13 acres of Conklin's lease has no oysters and few shells.

The area does not appear to have a natural set. Therefore, to be productive it must be first planted with seed oysters. At present the soft mud bottom would not appear to support oysters without first planting shells to harden the bottom.

Therefore, its present "value" would be that of the bottom which appears to be wholly soft mud.

Table 1

Oyster Ground Leases Studied, Number of Stations and
 Samples Taken in the Vicinity of the US 202 Bridge
 Across Nomini Creek - 1981.

<u>Lessee's Name</u>	<u>Acreage in Lease</u>	<u>Area Studied (Acres)</u>	<u>Number of Stations</u>	<u>Number of Samples</u>
Faunce, J. M.	4.76	4.76	19	36
Faunce, J. M.	6.28	3.45	13	26
Conklin, Mrs. Deborah				
Tract I	7.91	7.91	35	70
Tract II	13.66	9.04	48	94
Portion in proposed right-of-way	--	2.13	12	24

Table 2

Method of Calculating Estimates of Densities and Quantities of Shell and Oysters.

1. Calculation of the area covered by each grab of the tongs was done in the following manner:

The heads of the tongs were tied, and the distance which the line allowed them to open was measured, along with the width of the tong heads. The two measurements were multiplied to give the area of bottom covered per lick or grab. Two pair of tongs, one with 12 foot shafts and one with 16 foot shafts, were used, and the areas which they covered were different.

2. Estimated densities of shell were calculated as shown below:

In a sample of several quarts there were 12 shells per quart; with this ratio quantities of shell were converted to quarts. Quantity was divided by area covered to yield density. To convert density from quarts per square foot to bushels per acre the ratios of 50 quarts per bushel and 43,560 square feet per acre were used.

3. Estimated quantities of shell were calculated as shown:

Using data from Conklin's Tract 1 (an area of 7.91 acres) for an example, combining data from all stations (Table 3) shows that a total of 6.8 quarts of shell were tonged from 215.88 square feet of bottom.

$$\begin{aligned} & (6.8 \text{ quarts} \div 50 \text{ quarts per bushel}) \times \\ & (43,560 \text{ square feet per acre} \div 215.88 \text{ ft}^2) \times \\ & 7.91 \text{ acres} = 217.1 \text{ bushels of shell estimated} \\ & \text{to be on Tract 1} \end{aligned}$$

4. No oysters were taken in this study, but if they had been found, then the method of calculations would be as described in 1, 2 and 3 above.

Table 3

Results of Sampling Two Tracts of Oyster Planting Ground
Leased by Mrs. Deborah Conklin - December 1981.

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oysters	Oyster Boxes	Shell			
					Volume (qts)	Percent Buried	Density (Qts/ft ²)	
Tract I								
A 4	M	7.12	0	0	0.0	--	--	
B 4	M	6.14	0	0	0.1	100	0.02	
5	M	6.14	0	0	0.0	--	--	
6	M	6.14	0	0	0.0	--	--	
C 3	M	6.14	0	0	0.1	100	0.02	
4	M	6.14	0	0	0.0	--	--	
5	M	6.14	0	0	0.2	100	0.03	
6	M	6.14	0	0	0.0	--	--	
D 3	M	6.14	0	0	0.0	--	--	
4	M	6.14	0	0	0.0	--	--	
5	M	6.14	0	0	0.0	--	--	
6	M	6.14	0	0	0.0	--	--	
E 3	M	6.14	0	0	0.0	--	--	
4	M	6.14	0	0	0.0	--	--	
5	M	6.14	0	0	0.9	100	0.15	
6	M	6.14	0	0	0.7	50	0.11	
F 3	M	6.14	0	0	0.0	--	--	
4	M	6.14	0	0	0.0	--	--	
5	M	6.14	0	0	0.0	--	--	
6	M	6.14	0	0	1.7	70	0.28	
G 3	M	6.14	0	0	0.0	--	--	
4	M	6.14	0	0	0.2	100	0.03	
5	M	6.14	0	0	0.5	100	0.08	
6	M	6.14	0	0	0.0	--	--	
H 2	M	6.14	0	0	0.0	--	--	
3	M	6.14	0	0	0.0	--	--	
4	M	6.14	0	0	0.6	100	0.10	

Table 3 (Contd.)

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oysters	Oyster Boxes	Shell			
					Volume (qts)	Percent Buried	Density (Qts/ft ²)	
I 2	M	6.14	0	0	0.0	--	--	
3	M	6.14	0	0	0.2	100	0.03	
4	M	6.14	0	0	0.9	91	0.15	
J 2	M	6.14	0	0	0.0	--	--	
3	M	6.14	0	0	0.2	100	0.03	
4	M	6.14	0	0	0.3	100	0.05	
K 3	M	6.14	0	0	0.0	--	--	
Totals for Tract I			215.88	0	0	6.8		0.03
Tract II								
B-C 7	M	6.14	0	0	0.0	--	--	
8	M	6.14	0	0	0.0	--	--	
9	M	6.14	0	0	0.1	100	0.02	
10	M	6.14	0	0	0.0	--	--	
11	M	6.14	0	0	0.0	--	--	
12	M	6.14	0	0	0.0	--	--	
13	M	6.14	0	0	0.0	--	--	
C 7	M	6.14	0	0	0.6	100	0.10	
8	M	6.14	0	0	0.4	100	0.06	
9	M	6.14	0	0	0.3	100	0.05	
10	M	6.14	0	0	0.0	--	--	
11	M	6.14	0	0	0.1	100	0.02	
12	M	6.14	0	0	0.0	--	--	
13	M	6.14	0	0	0.0	--	--	
D 7	M	6.14	0	0	0.0	--	--	
8	M	6.14	0	0	1.3	100	0.21	
9	M	6.14	0	0	0.0	--	--	
10	M	6.14	0	0	0.0	--	--	
11	M	6.14	0	0	0.0	--	--	
12	M	6.14	0	0	0.0	--	--	
13	M	6.14	0	0	0.0	--	--	
E 7	M	6.14	0	0	0.0	--	--	
8	M	6.14	0	0	2.7	100	0.44	
9	M	6.14	0	0	0.1	100	0.02	
10	M	6.14	0	0	0.0	--	--	
11	M	6.14	0	0	0.0	--	--	
12	M	6.14	0	0	0.0	--	--	
13	M	6.14	0	0	0.0	--	--	

Table 3 (Contd.)

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oysters	Oyster Boxes	Shell		
					Volume (qts)	Percent Buried	Density (Qts/ft ²)
F 7	M	6.14	0	0	0.9	91	0.15
8	M	6.14	0	0	2.2	92	0.36
9	M	6.14	0	0	0.0	---	---
10	M	6.14	0	0	0.0	---	---
11	M	6.14	0	0	0.0	---	---
12	M	6.14	0	0	0.0	---	---
13	M	6.14	0	0	0.0	---	---
G 7	M	6.14	0	0	0.7	100	0.11
8	M	6.14	0	0	1.9	100	0.31
9	M	6.14	0	0	0.6	100	0.10
10	M	6.14	0	0	0.0	---	---
11	M	6.14	0	0	0.0	---	---
12	M	6.14	0	0	0.0	---	---
13	M	6.14	0	0	0.0	---	---
H 8	M	3.07	0	0	0.0	---	---
9	M	3.07	0	0	0.0	---	---
10	M	6.14	0	0	0.0	---	---
11	M	6.14	0	0	0.0	---	---
12	M	6.14	0	0	0.0	---	---
13	M	6.14	0	0	0.0	---	---
Totals for Tract II		288.58	0	0	11.9		0.04

Table 4

Sampling Results in Area of Proposed Right-of-Way (all on Mrs. Conklin's lease) - December 1981.

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oysters	Oysters Boxes	Shell		
					Volume (qts)	Percent Buried	Density (Qts/ft ²)
B-C 7	M	6.14	0	0	0.0	--	--
8	M	6.14	0	0	0.0	--	--
C 7	M	6.14	0	0	0.6	100	0.10
8	M	6.14	0	0	0.4	100	0.06
D 7	M	6.14	0	0	0.0	--	--
8	M	6.14	0	0	1.3	100	0.21
E 7	M	6.14	0	0	0.0	--	--
8	M	6.14	0	0	2.7	100	0.44
F 7	M	6.14	0	0	0.9	91	0.15
8	M	6.14	0	0	2.2	92	0.36
G 7	M	6.14	0	0	0.7	100	0.11
8	M	6.14	0	0	1.9	100	0.31
Totals for area		73.68	0	0	10.7		0.145

Table 5

Results of Sampling Tracts of Oyster Planting Ground
Leased by J. M. Faunce - December 1981.

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oyster Oysters	Oyster Boxes	Shell		
					Volume (qts)	Percent Buried	Density (Qts/ft ²)
Upstream Lease							
H 8	M	3.07	0	0	0.0	--	--
9	M	3.07	0	0	0.0	--	--
I 8	M	7.12	0	0	0.3	100	0.04
9	M	7.12	0	0	0.0	--	--
10	M	7.12	0	0	0.0	--	--
11	M	7.12	0	0	0.0	--	--
12	M	7.12	0	0	0.0	--	--
13	M	7.12	0	0	0.0	--	--
J 9	M	7.12	0	0	0.8	100	0.11
10	M	7.12	0	0	0.6	100	0.08
11	M	7.12	0	0	0.0	--	--
12	M	7.12	0	0	0.0	--	--
13	M	7.12	0	0	0.0	--	--
K 11	M	7.12	0	0	0.0	--	--
12	M	7.12	0	0	0.0	--	--
13	M	7.12	0	0	0.0	--	--
L 12	M	7.12	0	0	0.0	--	--
13	M	7.12	0	0	0.0	--	--
M 13	M	7.12	0	0	0.0	--	--
Totals for Lease		127.18	0	0	1.7		0.01
Downstream Lease							
J 5	S	7.12	0	0	0.0	--	--
K 1	M	6.14	0	0	0.2	100	0.03
2	M	6.14	0	0	0.0	--	--
4	M	7.12	0	0	0.0	--	--

Table 5 (Contd.)

Station Designation	Bottom Type	Area Covered (ft ²)	Live Oysters	Oyster Boxes	Shell		
					Volume (qts)	Percent Buried	Density (Qts/ft ²)
L 1	M	6.14	0	0	0.0	--	--
2	M	6.14	0	0	0.0	--	--
3	M	6.14	0	0	0.0	--	--
4	M	7.12	0	0	0.0	--	--
M 1	M	6.14	0	0	0.0	--	--
2	M	6.14	0	0	0.0	--	--
3	M	7.12	0	0	0.5	100	0.07
N 1	M	7.12	0	0	0.0	--	--
2	M	7.12	0	0	0.0	--	--
Totals for Lease		85.70	0	0	0.7		0.008

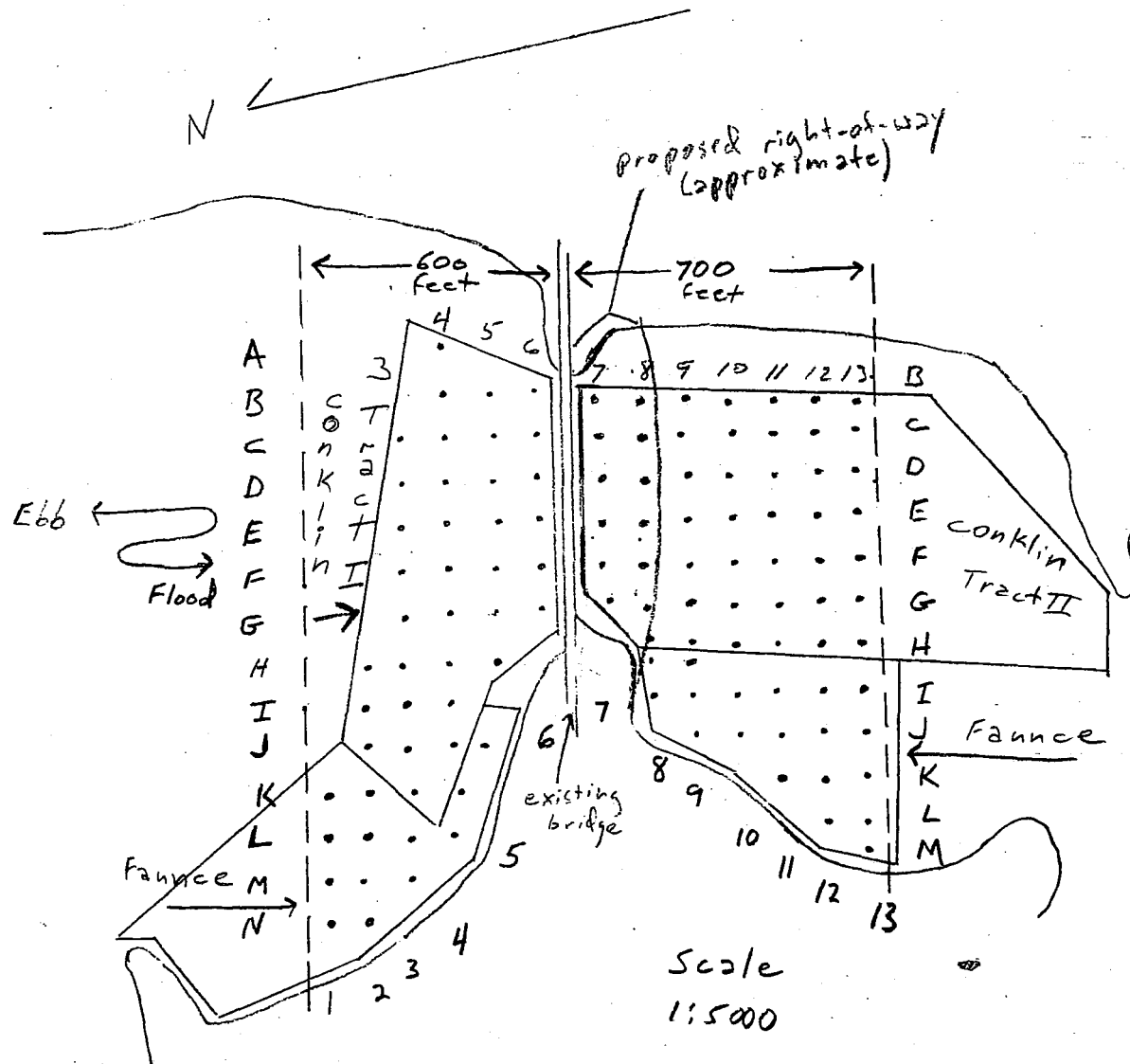


Figure 1. Leased oyster ground in the vicinity of Route 202 bridge across Nomini Creek. Dots show locations sampled by VIMS December 1981.

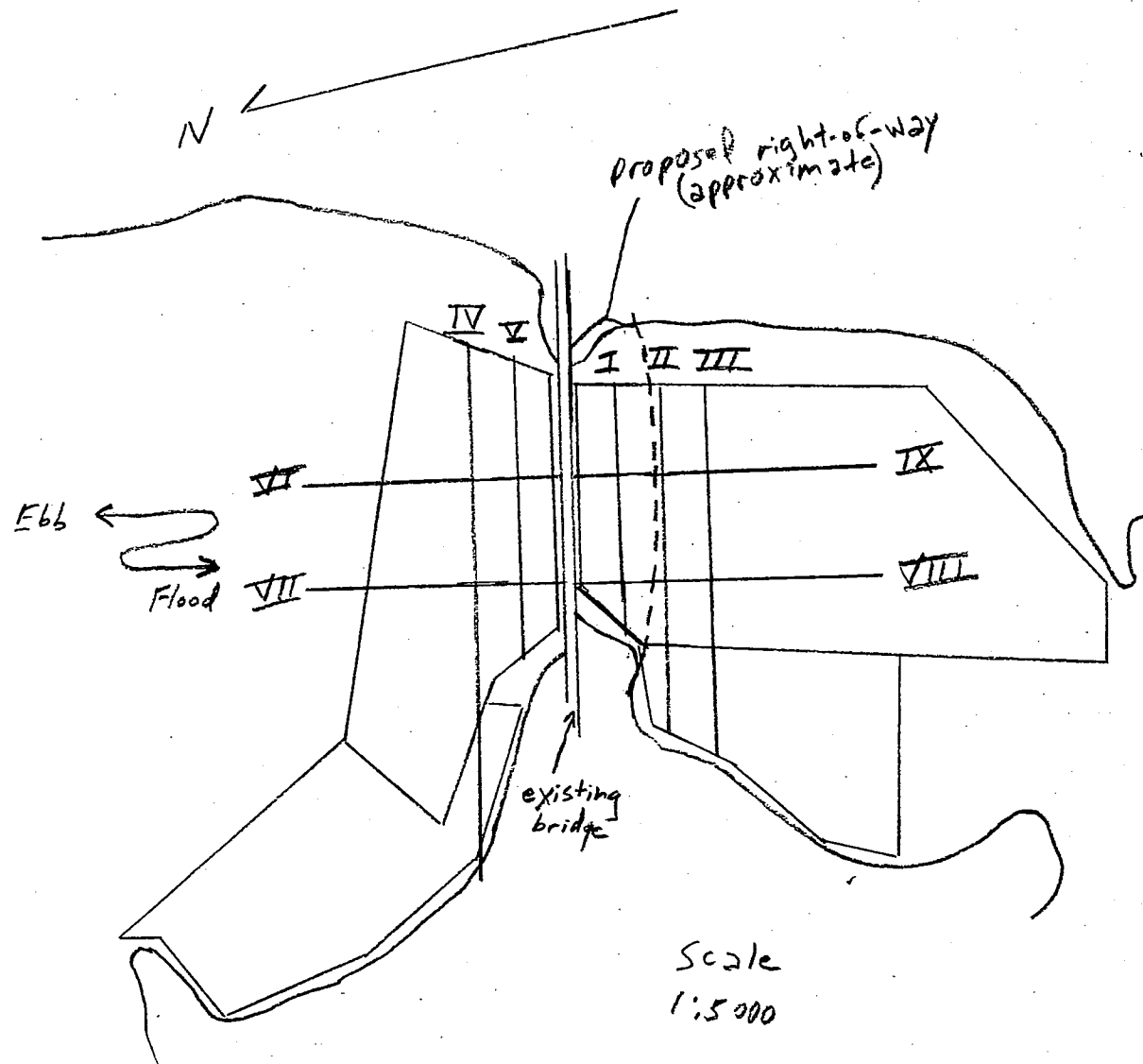
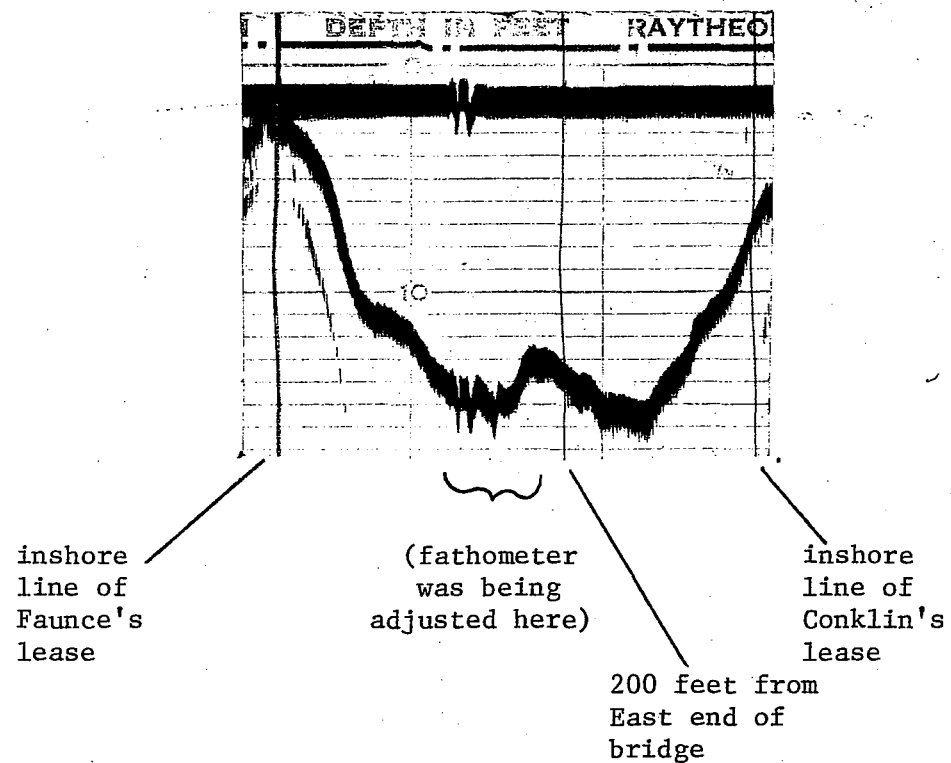


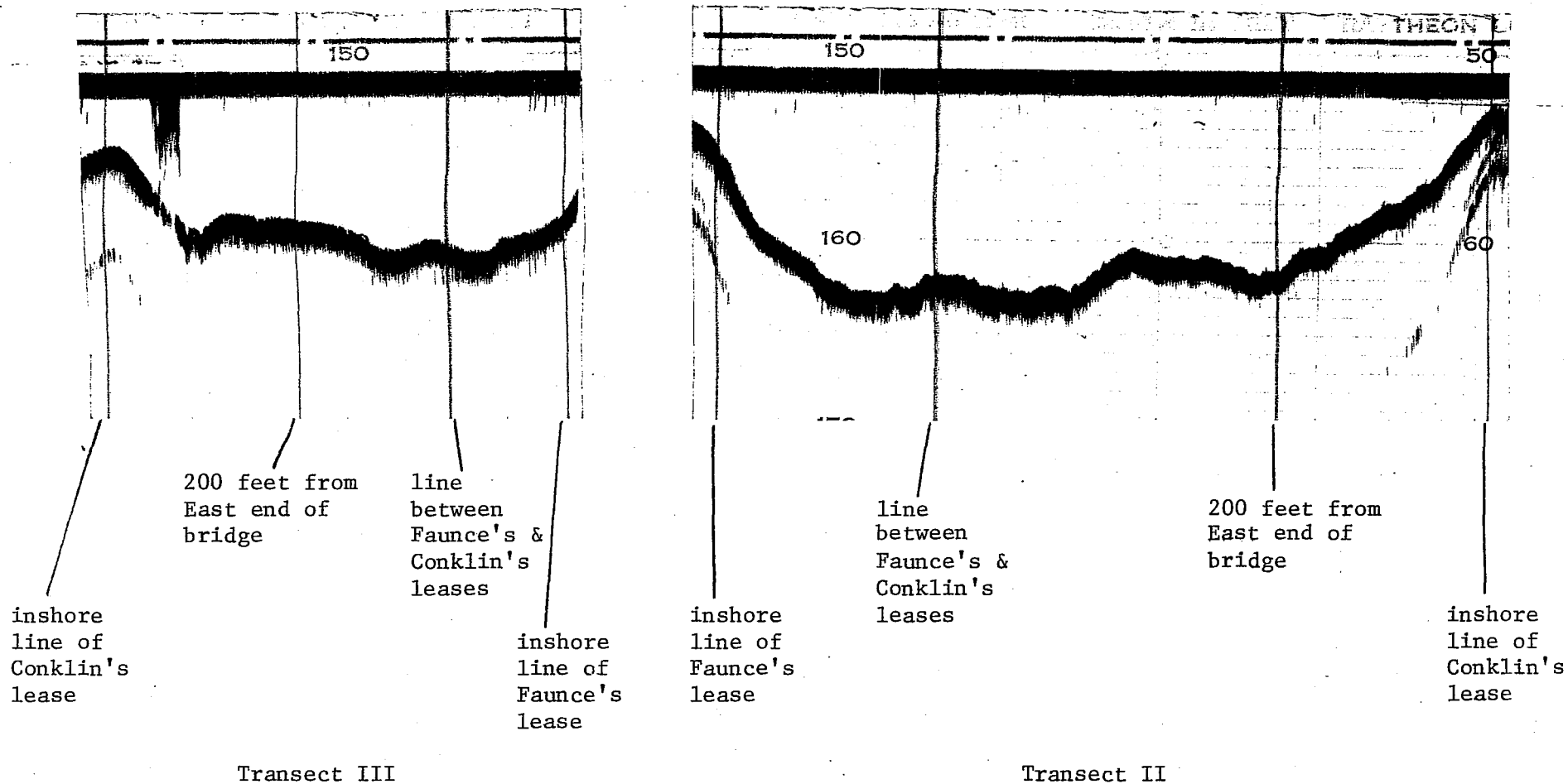
Figure 2. Leased oyster ground in the vicinity of the Route 202 bridge across Nomini Creek. Fathometer transects run in December 1981 are shown by Roman numerals.

APPENDIX

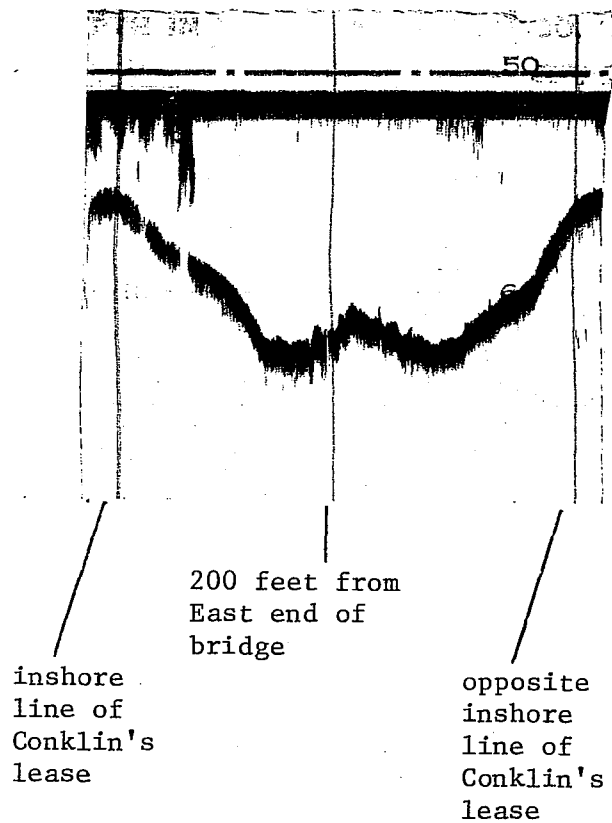
Traces made by a fathometer as it was run over the bottom in Nomini Creek on transects shown in Figure 2. Made 3 December 1981.



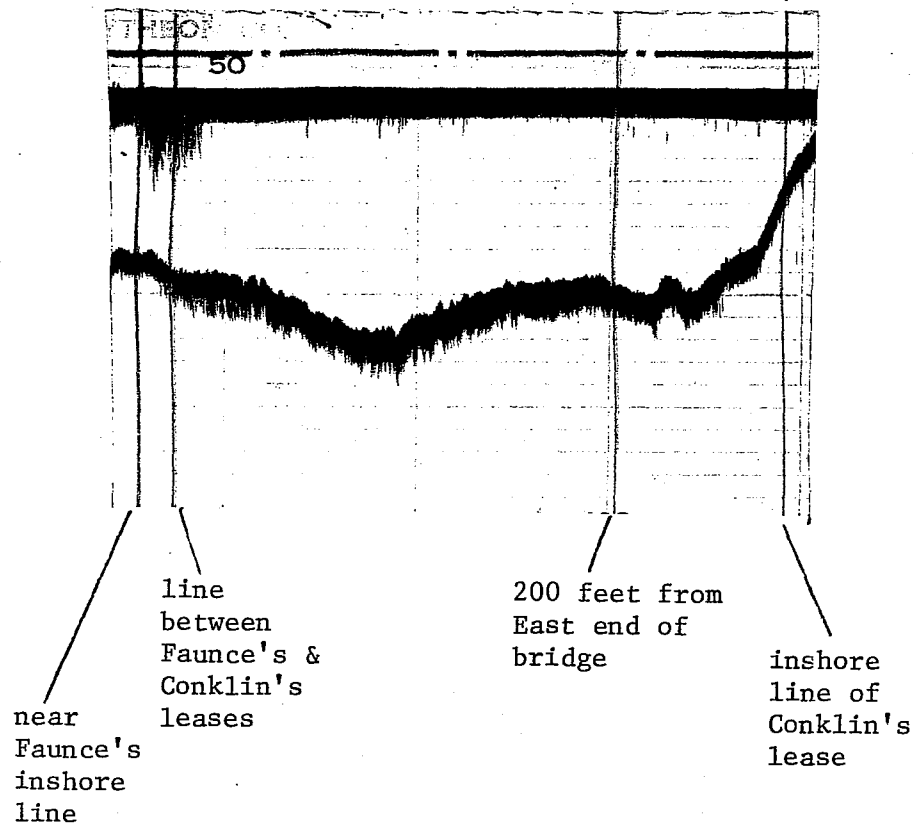
Transect I: Profile of the bottom traced by fathometer as the boat was run along a line parallel to the bridge and upstream of it by 100 feet; (see Figure 2). Made 3 December 1981.



Transects II and III: Profiles of the bottom traced by fathometer as the boat was run along lines parallel to the bridge and upstream of it by 200 feet (Transect II) and 300 feet (Transect III); (see Figure 2). Made 3 December 1981.

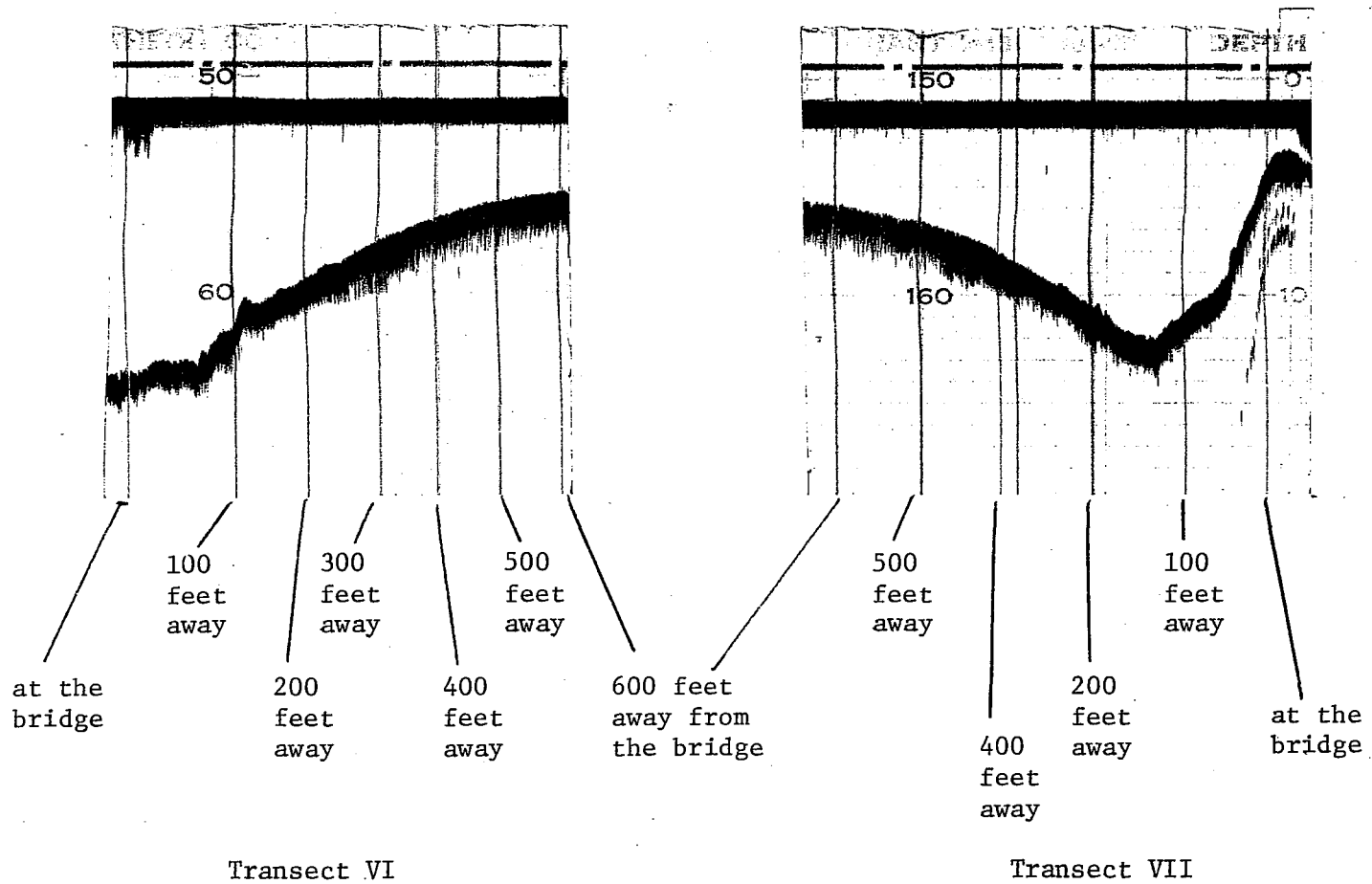


Transect IV

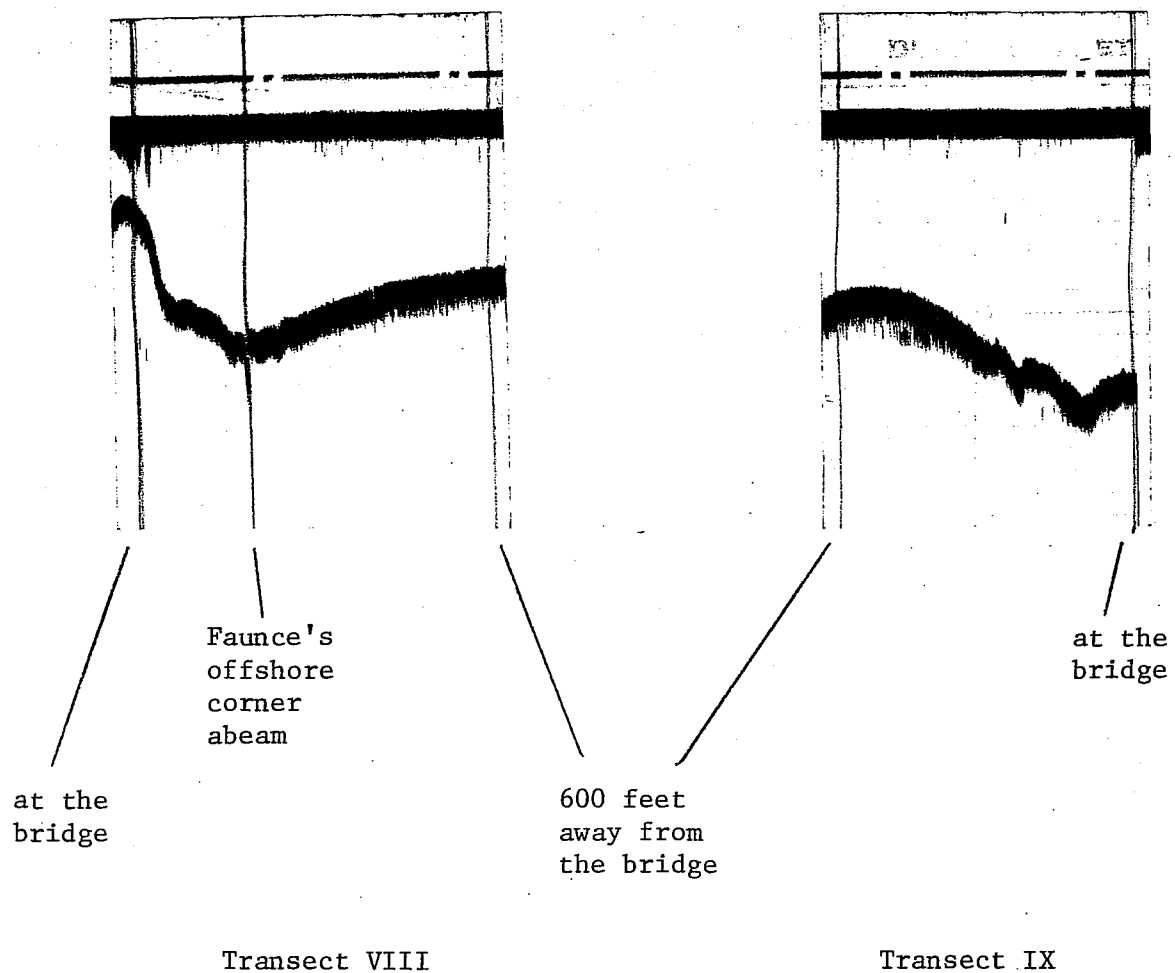


Transect V

Transects IV and V: Profiles of the bottom traced by fathometer as the boat was run along lines parallel to the bridge and downstream of it by 100 feet (Transect IV) and 200 feet (Transect V); (see Figure 2). Made 3 December 1981.



Transects VI and VII: Profiles of the bottom traced by fathometer as the boat was run along lines at right angles to the bridge and downstream of it; (see Figure 2). Made 3 December 1981.



Transects VIII and IX: Profiles of the bottom traced by fathometer as the boat was run along lines at right angles to the bridge and upstream of it; (see Figure 2). Made 3 December 1981.