COMPREHENSIVE COASTAL INVENTORY PROGRAM

FINAL REPORT

VOLUME II

Coastal Inventory Program
Commonwealth of Virginia

and

Tidal Rivers Inventory Project
Coastal Resource Management Program
Grant No. NA89AA-D-CZ134
Task 2A
Grant No. NA88AA-D-CZ091

Compiled by

Marcia R. Berman
J. Berchman Smithson

Under the Direction of

Dr. Suzette M. Kimball
Dr. Carl H. Hershner, Jr.

Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, Virginia 23062

Submitted To

Virginia Council on the Environment
Richmond, Virginia

COASTAL ZONE
INFORMATION CENTER

Virginia: Coastal Zone Management Program

GC
1018
.C66
1991
v.2

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

Property of CSC Library

COMPREHENSIVE COASTAL INVENTORY PROGRAM

FINAL REPORT

VOLUME II

Coastal Inventory Program
Commonwealth of Virginia

and

Tidal Rivers Inventory Project
Coastal Resource Management Program
Grant No. NA89AA-D-CZ134
Task 2A
Grant No. NA88AA-D-CZ091

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Compiled by

Marcia R. Berman
J. Berchman Smithson

Under the Direction of

Dr. Suzette M. Kimball
Dr. Carl H. Hershner, Jr.

Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, Virginia 23062

Submitted To

Virginia Council on the Environment
Richmond, Virginia

GC1018 .C66 1991 V.2
24841936
APR 21 1997

VOLUME II.

TABLE OF CONTENTS

VOLUME I.

ACKNOWLEDGEMENTS i
EXECUTIVE SUMMARY ii

CHAPTER PAGE

1. INTRODUCTION 1

2. VIMS SHORELINE COVERAGE 6

3. VMRC SHORELINE COVERAGE 60

4. MAPPING SCALES 136

5. VIDEO COVERAGE 144

6. AERIAL IMAGERY 145

7. FLIGHT LINE COVERAGE 162

VOLUME II.

8. 1989 SHORELINE COVERAGE 1

9. SHORELINE STABILIZATION COVERAGE 8

10. SEDIMENT SAMPLE COVERAGE 21

11. TIDAL MARSH INVENTORY COVERAGE 69

12. LEFT/RIGHT BANK COVERAGE 108

13. RIVER REACH INFORMATION COVERAGE 111

14. PROCEDURE FOR ANALYZING THE HISTORICAL CHANGE IN SHORELINE POSITIONS 143

15. PROCEDURE FOR ANAYZING THE EFFECTS OF LANDUSE ON VEGETATED WETLANDS 146

16. PROCEDURE FOR ANALYZING THE SPATIAL AND TEMPORAL CHANGES IN WETLAND SPECIES 161

APPENDIX I 167

APPENDIX II 172

LIST OF FIGURES

FIGURE PAGE

1. Virginia Marine Resources Commission Shoreline Map Index 61

LIST OF TABLES

TABLE		PAGE
1.	Shoreline Stabilization Structures, Westmoreland County - L6452540	12
2.	Shoreline Stabilization Structures, Westmoreland County - R6452540	13
3.	Shoreline Stabilization Structures, Westmoreland County - L6302560	15
4.	Shoreline Stabilization Structures, Westmoreland County - L6602540	17
5.	Shoreline Stabilization Structures, Westmoreland County - L6602520	19
6.	Shoreline Stabilization Structures, Westmoreland County - R6602520	20
7a.	Sediment Survey Data - Grain Size Percentages Westmoreland County - Foreshore	46
7b.	Sediment Survey Data - Grain Size Statistics Westmoreland County - Foreshore	48
8a.	Sediment Survey Data - Grain Size Percentages Westmoreland County - Backshore	50
8b.	Sediment Survey Data - Grain Size Statistics Westmoreland County - Backshore	53
9.	Westmoreland County Foreshore Slope Inventory	54
10a.	Sediment Survey Data - Grain Size Percentages Lancaster County - Foreshore	56
10b.	Sediment Survey Data - Grain Size Statistics Lancaster County - Foreshore	57
11a.	Sediment Survey Data - Grain Size Percentages Lancaster County - Backshore	59
11b.	Sediment Survey Data - Grain Size Statistics Lancaster County - Backshore	60
12.	Lancaster County Foreshore Slope Inventory	62

LIST OF TABLES (continued)

TABLE		PAGE
13a.	Sediment Survey Data - Grain Size Percentages Richmond County - Foreshore	63
13b.	Sediment Survey Data - Grain Size Statistics Richmond County - Foreshore	64
14a.	Sediment Survey Data - Grain Size Percentages Richmond County - Backshore	65
14b.	Sediment Survey Data - Grain Size Statistics Richmond County - Backshore	66
15.	Richmond County Foreshore Slope Inventory	67
16.	Northumberland County Foreshore Slope Inventory	68

APPENDICES

APPENDIX	PAGE
1. Completed Topographic Coverages	167
2. High Resolution Shoreline Coverages	172

CHAPTER VIII. 1989 SHORELINE COVERAGE

VIII. 1989 SHORELINE COVERAGE

The 1989 vertical photographs collected by VIMS (ref. Chapter 6) were used to establish the 1989 shoreline position. Registration of the photographs against known benchmarks was necessary before mapping could begin. The VMRC shoreline maps (ref. Chapter 3) are registered through an extensive set of surveyed benchmarks, each identified by a state plane coordinate pair. These benchmarks are shown on the map. However, this set of maps does not contain surveyed locations of physical parameters, such as a house or road intersection, that can be identified on photographs. The photographs do not show benchmark markers. Consequently, the photographs could not be mapped directly onto the VMRC shoreline base.

The benchmarks used by the VMRC were relocated in the field with the assistance of VMRC staff. They were used to establish base reference points for all subsequent field work, which included surveying the locations of physical features that could be identified in the photographs. With both the aerial imagery and the shoreline maps keyed to the state plane coordinate system, overlays of the two shoreline positions could be made.

Field efforts were concentrated along a portion of the Potomac River and the eastern shore of Lower Machodoc Creek in Westmoreland County. A Topcon GTS-3B infrared digital survey instrument was used for field surveys. State plane coordinate pairs for each surveyed feature were subsequently entered into the ARCInfo® format and stored as a GIS coverage.

The field surveying, although extremely accurate (error <.02% over a 12-mile reach), was labor-intensive and prohibitively expensive. It was determined that field surveying of the 5,000 miles of coastline to be included eventually in the database was not feasible given the time and cost constraints dictated by the program scope of work. Consequently, other methods of annotating photographic benchmarks were investigated. The method showing the greatest potential in terms of accuracy (positioning to within 1.5 m), time and cost is a Global Positioning System (GPS). Acquisition of such a system is planned for 1990-1991 and all subsequent surveying activity will be with GPS technology.

Once photographic benchmarks were established, a Bausch & Lomb ZT4-H Zoom Transfer Scope (ZTS) was used to superimpose the 1989 shoreline image onto the 1976 baseline for transcription. State plane coordinate values of the photographic control points previously entered into the database were merged with the VMRC shoreline data coverage and plotted at 1:7,200. Because the images are scaled at 1:7,200, this becomes the highest usable resolution, despite the 1:5,000 scale of the VMRC maps.

The ZTS uses a system of mirrors and lenses to transfer one image onto another. With a minimum of two control points in each field of view (three points are preferable, and more were used in complex areas), the photographic control points on the prints are adjusted and aligned with the plotted points on the baseline maps. During this process, image distortion due to linear stretch and rotation can be diminished or removed. The position of the shoreline is transcribed by a staff member who distinguishes tonal changes on the image that are due to variations in the water content of the foreshore sediments. The transcribed map line width is 0.3 mm which is equivalent to 1.5 m ground distance at a scale of 1:7,200. Thus, the functional precision of the transcribed shoreline position is +/- 1.5 m.

Once transcribed, the shoreline position is digitized in the same manner as the 1976 baseline and stored as a data layer. The VMRC shoreline maps are referenced to mean low water. As it exists, the 1989 shoreline position is not tide-corrected. However, each photograph is documented in terms of the flight date and time in order to complete tide-stage corrections. Work is continuing on the development of algorithms to automatically correct the shoreline position.

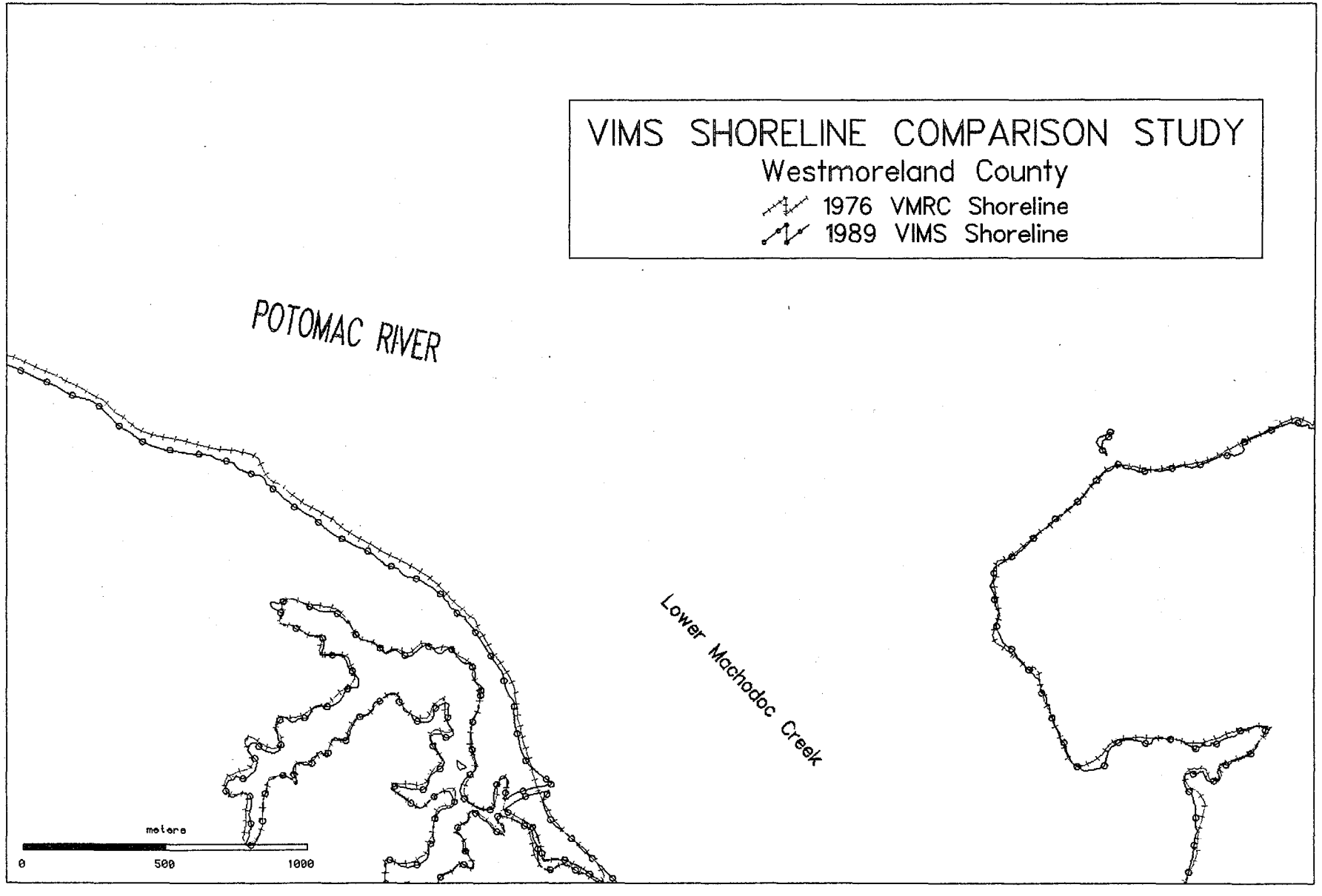
COASTAL INVENTORY

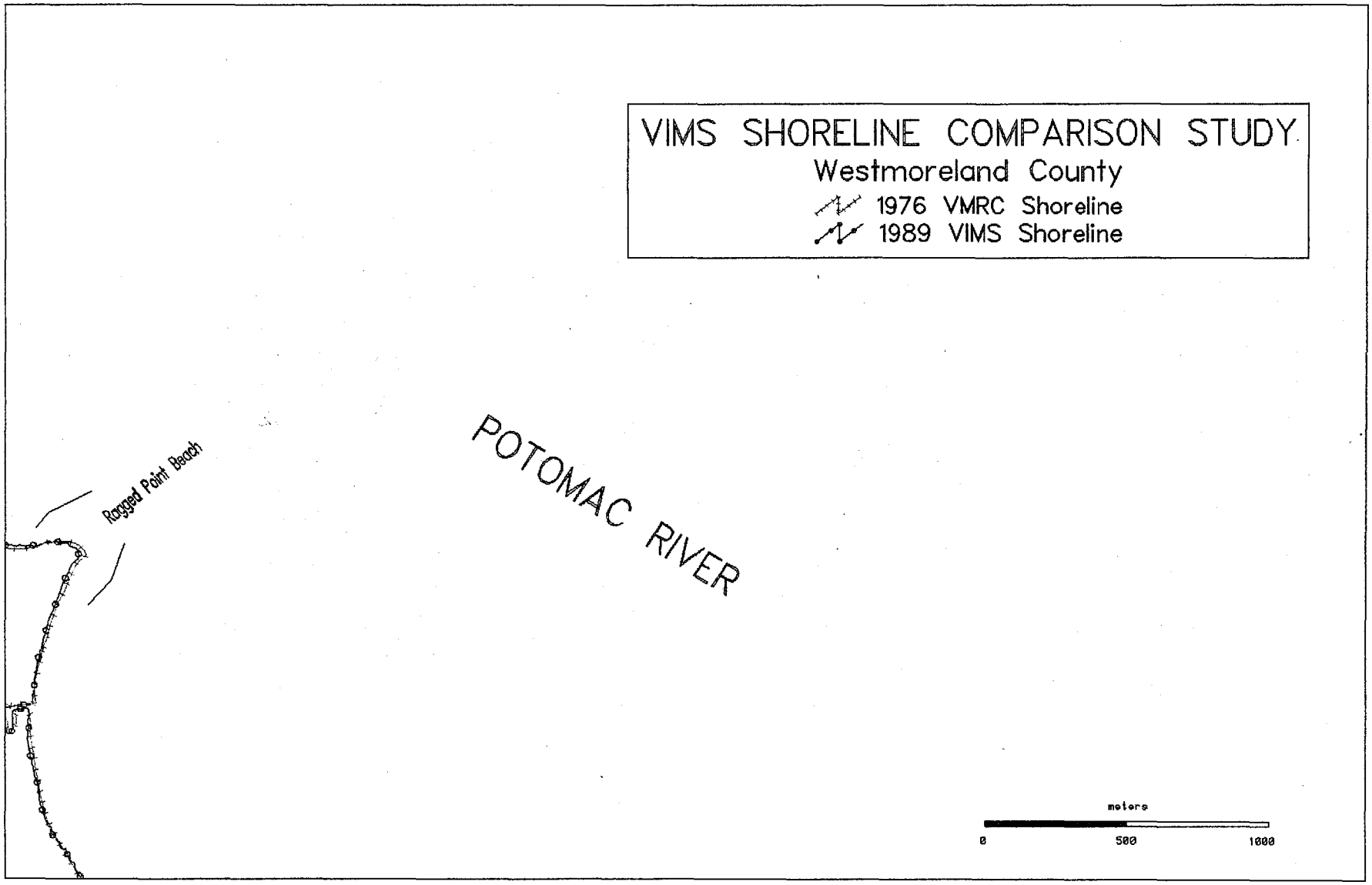
AVERAGE TIME AND DISC SPACE USED*

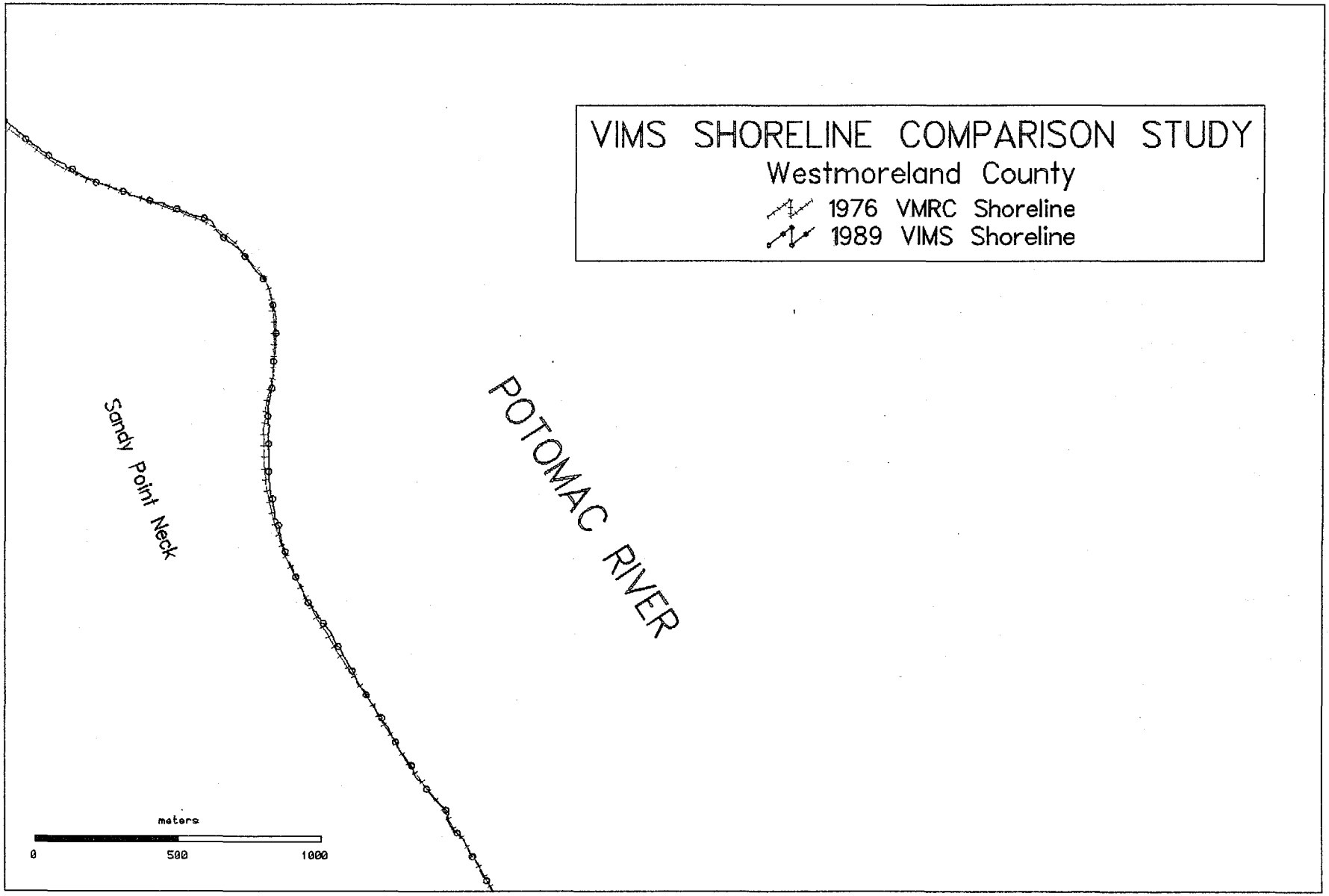
1989 VIMS SHORELINE

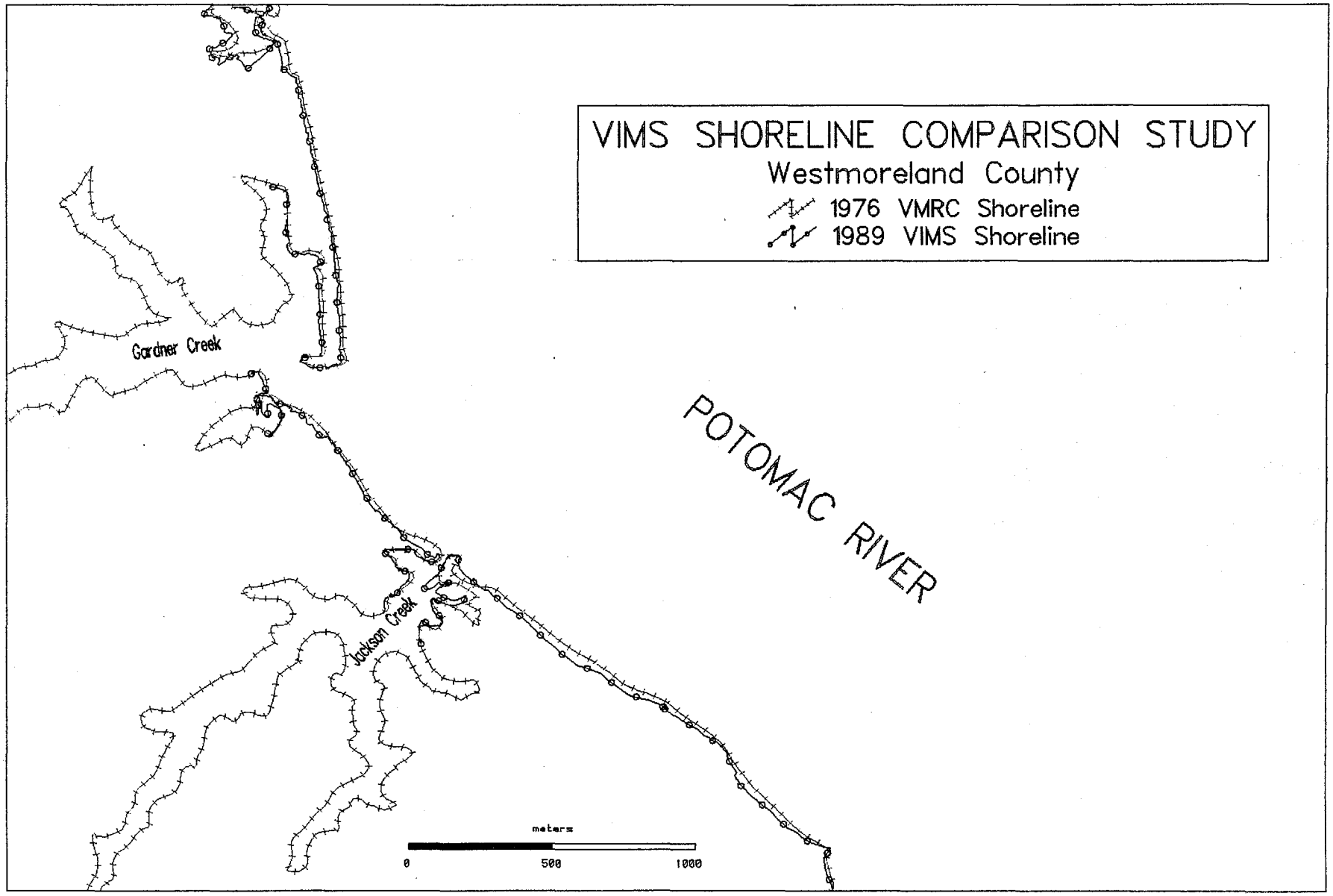
MAP NUMBER	TIME	DISC SPACE
6152560	.75	135168
6302560	.5	137216
6452540	2.5	30720
6602520	2.75	147456
6602540	.75	30720
AVERAGE	1.45	96256

*TIME IN HOURS, DISC SPACE IN BYTES


VIMS SHORELINE COMPARISON STUDY
Westmoreland County
1976 VMRC Shoreline
1989 VIMS Shoreline
POTOMAC RIVER
Lower Machodoc Creek
meters
0
500
1000


VIMS SHORELINE COMPARISON STUDY
Westmoreland County
1976 VMRC Shoreline
1989 VIMS Shoreline
POTOMAC RIVER
Ragged Point Beach
meters
0
500
1000


VIMS SHORELINE COMPARISON STUDY
Westmoreland County
1976 VMRC Shoreline
1989 VIMS Shoreline
POTOMAC RIVER
Sandy Point Neck
meters
0
500
1000


VIMS SHORELINE COMPARISON STUDY
Westmoreland County
1976 VMRC Shoreline
1989 VIMS Shoreline
Gardner Creek
Jackson Creek
POTOMAC RIVER
meters
0
500
1000

CHAPTER IX. SHORELINE STABILIZATION COVERAGE

IX. SHORE STABILIZATION STRUCTURES

The Shore Stabilization Coverage (STRUC) is the longshore delineation of man-made mitigation structures along the coast. A portion of Westmoreland County has been completed and the folio is presented here at a scale of 1:20,000. The coverage is limited to riprap, bulkheads, groin fields and jettys which can be easily identified from the vertical images.

Delineations were performed using geographically registered vertical photographs (ref. Chapter 3) and scaled plots of the MRC shoreline record. A Zoom Transfer Scope was used to transpose the vertical image onto the computer generated plots of the 1976 shoreline position at a scale of 1:7200 (photo scale). The digital coverage is created by digitizing and coding the linear extent of the shoreline defended by each of the considered mitigation structures. Combinations of engineering structures were also coded separately. The total length of a shoreline reach artificially protected can then be computed. This information is important for assessing the effectiveness of mitigation structures in halting shore erosion, as well as quantifying the volume of sediment lost to the littoral system as a result of the defense. The following documentation contains information pertaining to the STRUC coverage.

GEOGRAPHIC DATA SET DESCRIPTION

VIMS GIS Lab Prefix STRUCT

Data Layer Name SHORE STABILIZATION COVERAGE

Description A COVERAGE OF SHORELINE STRUCTURES INCLUDING RIP RAP, BULKHEADS, GROINS AND JETTYS.

Year(s) Collected 1989

Base Maps used for Digitizing VMRC SHORELINE MAPS

Digitizing Scale 1:7200

Geographic Extent PORTION OF WESTMORELAND COUNTY

How Collected (Describe):

THE 1989 VERTICAL PHOTOGRAPHS WERE SUPERIMPOSED ON TO THE VMRC SHORELINE MAPS USING A ZOOM TRANSFER SCOPE (ZTS). THE POSITION OF STRUCTURES WERE DELINEATED AND THEN DIGITIZED.

Actual/Intended Use or Purpose:

TO QUANTITATIVELY ASSES THE AMOUNT OF SHORELINE DEFENDED BY ARTIFICIAL STABILIZATION METHODS.

COASTAL INVENTORY

AVERAGE TIME AND DISC SPACE USED*

1989 SHORELINE STRUCTURES

MAP NUMBER	TIME	DISC SPACE
6152560	1.25	135168
6302560	.75	141312
6452540	2.5	278528
6602520	2.75	397312
6602540	1.0	145408
AVERAGE	1.65	219545

*TIME IN HOURS, DISC SPACE IN BYTES

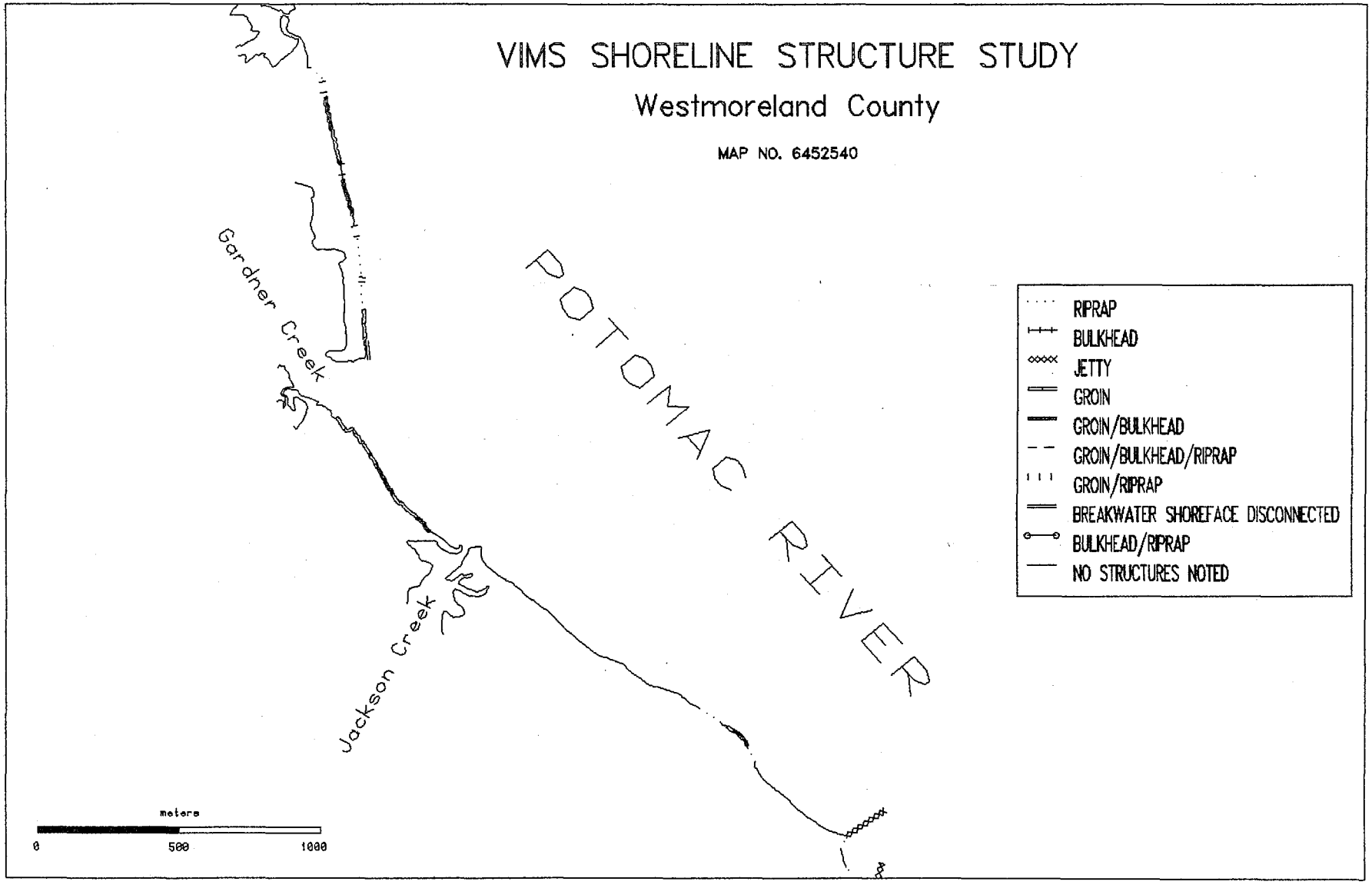

VIMS SHORELINE STRUCTURE STUDY
Westmoreland County
MAP NO. 6452540
POTOMAC RIVER
Gardner Creek
Jackson Creek
RIPRAP
BULKHEAD
JETTY
GROIN
GROIN/BULKHEAD
GROIN/BULKHEAD/RIPRAP
GROIN/RIPRAP
BREAKWATER SHOREFACE DISCONNECTED
BULKHEAD/RIPRAP
NO STRUCTURES NOTED
meters
0
500
1000

TABLE 1. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - L6452540

Structure	Code	Total Length (m)	Frequency*
Riprap	1	339.03	5
Bulkhead	2	59.63	1
jetty	3	------	0
groin field	4	351.90	3
breakwater (off)	8	67.20	1
groin/bulk.	9	1212.37	5
groin/rip.	10	130.95	3
gr/bulk/rip.	11	------	0
bulk/rip.	13	1009.60	1
no structures	22	5975.46	10

* Frequency = number of arcs
Total number of arcs = 29
Total shoreline length = 9,146.14 meters

TABLE 2. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - R6452540

Structure	Code	Total Length (m)	Frequency*
Riprap	1	267.24	5
Bulkhead	2	------	0
jetty	3	221.24	2
groin field	4	25.82	1
breakwater (off)	8	------	0
groin/bulk.	9	75.31	1
groin/rip.	10	------	0
gr/bulk/rip.	11	------	0
bulk/rip.	13	------	0
no structures	22	2392.07	8

* Frequency = number of arcs
Total number of arcs = 17
Total shoreline length = 2,981.68 meters

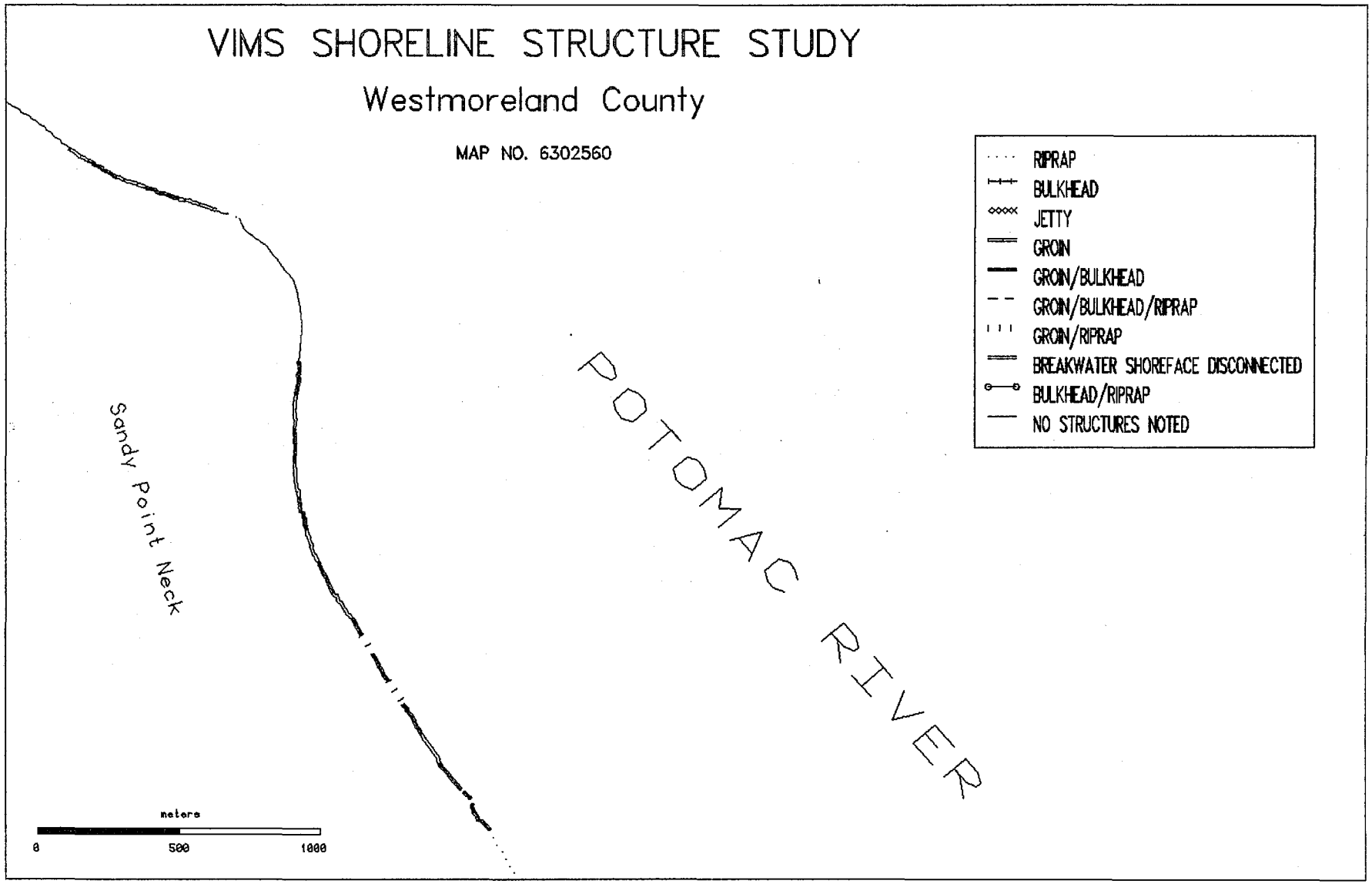

VIMS SHORELINE STRUCTURE STUDY
Westmoreland County
MAP NO. 6302560
RIPRAP
BULKHEAD
JETTY
GROIN
GROIN/BULKHEAD
GROIN/BULKHEAD/RIPRAP
GROIN/RIPRAP
BREAKWATER SHOREFACE DISCONNECTED
BULKHEAD/RIPRAP
NO STRUCTURES NOTED
POTOMAC RIVER
Sandy Point Neck
meters
0
500
1000

TABLE 3. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - L6302560

Structure	Code	Total Length (m)	Frequency*
Riprap	1	1117.56	5
Bulkhead	2	------	0
jetty	3	------	0
groin field	4	353.69	4
breakwater (off)	8	------	0
groin/bulk.	9	2040.62	7
groin/rip.	10	181.65	2
gr/bulk/rip.	11	------	0
bulk/rip.	13	------	0
no structures	22	1647.29	4

* Frequency = number of arcs
Total number of arcs = 22
Total shoreline length = 5,340.81 meters

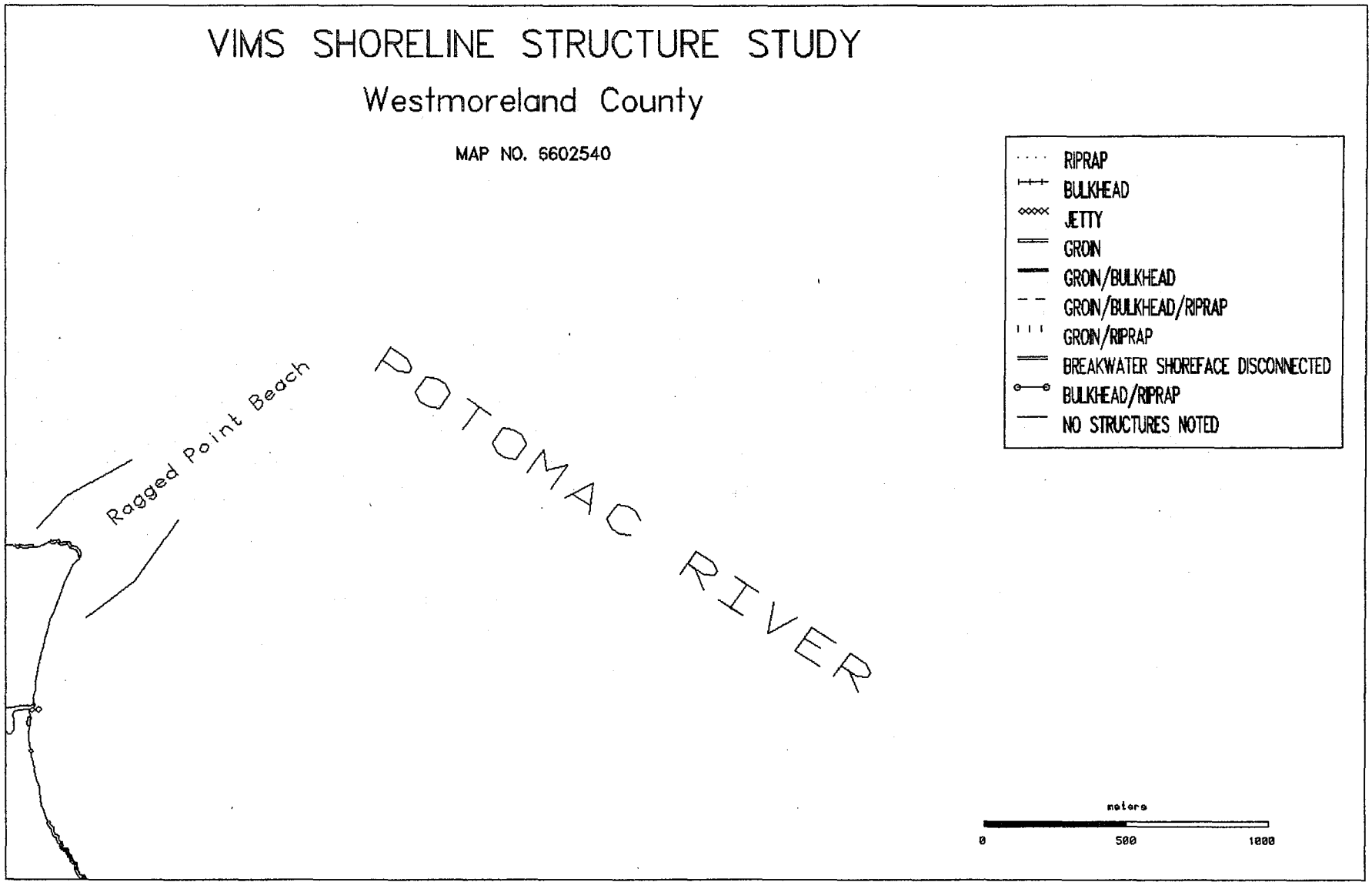

VIMS SHORELINE STRUCTURE STUDY
Westmoreland County
MAP NO. 6602540
RIPRAP
BULKHEAD
JETTY
GROIN
GROIN/BULKHEAD
GROIN/BULKHEAD/RIPRAP
GROIN/RIPRAP
BREAKWATER SHOREFACE DISCONNECTED
BULKHEAD/RIPRAP
NO STRUCTURES NOTED
Ragged Point Beach
POTOMAC RIVER
meters
0
500
1000

TABLE 4. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - L6602540

Structure	Code	Total Length (m)	Frequency*
Riprap	1	13.3	1
Bulkhead	2	638.31	7
jetty	3	60.53	3
groin field	4	858.21	11
breakwater (off)	8	------	0
groin/bulk.	9	620.71	7
groin/rip.	10	------	0
gr/bulk/rip.	11	------	0
bulk/rip.	13	------	0
no structures	22	2063.61	13

* Frequency = number of arcs
Total number of arcs = 42
Total shoreline length = 4,254.67 meters

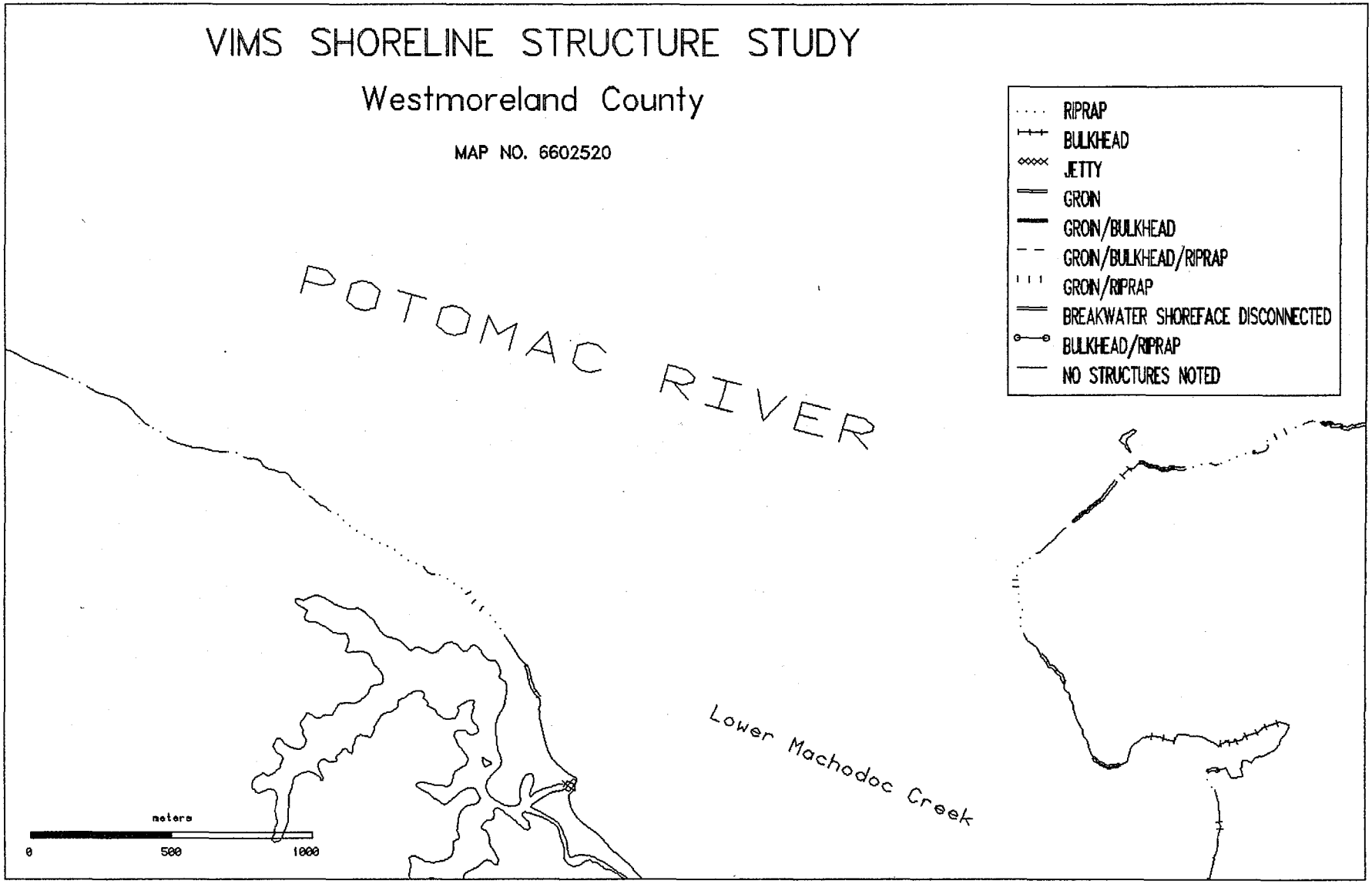

VIMS SHORELINE STRUCTURE STUDY
Westmoreland County
MAP NO. 6602520
RIPRAP
BULKHEAD
JETTY
GROIN
GROIN/BULKHEAD
GROIN/BULKHEAD/RIPRAP
GROIN/RIPRAP
BREAKWATER SHOREFACE DISCONNECTED
BULKHEAD/RIPRAP
NO STRUCTURES NOTED
POTOMAC RIVER
Lower Machodoc Creek
meters
0
500
1000

TABLE 5. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - L6602520

Structure	Code	Total Length (m)	Frequency*
Riprap	1	986.85	8
Bulkhead	2	------	0
jetty	3	88.97	2
groin field	4	179.05	2
breakwater (off)	8	------	0
groin/bulk.	9	------	0
groin/rip.	10	121.00	1
gr/bulk/rip.	11	------	0
bulk/rip.	13	------	0
no structures	22	13,902.72	20

* Frequency = number of arcs
Total number of arcs = 33
Total shoreline length = 15,278.59 meters

TABLE 6. SHORELINE STABILIZATION STRUCTURES
WESTMORELAND COUNTY - R6602520

Structure	Code	Total Length (m)	Frequency*
Riprap	1	952.09	12
Bulkhead	2	564.52	5
jetty	3	------	0
groin field	4	419.58	6
breakwater (off)	8	------	0
groin/bulk.	9	1688.75	10
groin/rip.	10	81.27	2
gr/bulk/rip.	11	23.81	1
bulk/rip.	13	------	0
no structures	22	3395.97	19

* Frequency = number of arcs
Total number of arcs = 49
Total shoreline length = 7125.99 meters

CHAPTER X. SEDIMENT SAMPLE COVERAGE

X. SEDIMENT SAMPLE COVERAGE

A sediment/slope data coverage (SED) has been incorporated into the GIS network at VIMS. Sediment size data and shoreface slope measurements are necessary to forecast potential storm surge incursion and erosion rates as well as to provide a data base from which to manage the Commonwealth's sand allocation procedures through the Shoreline Programs Bureau of the Department of Conservation and Recreation. Sediment samples and beach slope measurements have been collected from the backshore and foreshore beach units at 500 meter intervals along the tidal shorelines , or wherever there is a significant change in sediment size or beach slope. Beach slope was measured only at the foreshore with a Brunton Compass.

Sample locations were plotted and digitized at a scale of 1:24,000 and entered into the GIS framework. Sediment samples were processed at the VIMS Sediment Laboratory, and grain size distributions have been calculated using a combination of Rapid Sediment Analyzer (RSA) and pipette techniques. The RSA method measures the fall velocity of a grain and translates the fall velocity into an equivalent grain diameter. Pipette analysis similarly measures grain diameter as a function of density and settling time. These techniques are preferable to mechanical sieving methods when the hydraulic transport characteristics (e.g., erosion and deposition) of the sediment are of paramount importance. All sediment samples are archived at VIMS.

Grain size percents, standard sediment distribution statistics, and moment statistics were calculated and entered into the GIS data base as an attribute by station. Slope measurements are similarly stored as an attribute table within the SED coverage. The information can be queried through the system by choosing a site on the sediment station coverage. Foreshore and backshore data are stored as separate attributes.

Following is a folio of all anticipated sediment station for the Northern Neck region of Virginia. Maps are represented at a scale of 1:68,000. The current available sediment and slope attribute data for the Northern Neck is included in tables divided by county. The database will be updated as more sediment samples are processed.

GEOGRAPHIC DATA SET DESCRIPTION

VIMS GIS Lab Prefix SED

Data Layer Name SEDIMENT SAMPLE COVERAGE

Description COVERAGE INCLUDES A PLOT OF SAMPLE SITE LOCATIONS, SEDIMENT SAMPLE ANALYSIS AND BEACH SLOPE MEASUREMENTS.

Year(s) Collected 1989-1990

Base Maps used for Digitizing USGS TOPOGRAPHIC MAPS (MYLAR MEDIUM)

Digitizing Scale 1:24,000

Geographic Extent NORTHERN NECK OF VIRGINIA

How Collected (Describe):

SEDIMENT SAMPLES WERE COLLECTED BY HAND FROM THE FORSHORE AND BACKSHORE AT DESIGNATED SITES. FORSHORE SLOPE MEASUREMENTS WERE MADE WITH A BRUNTON COMPASS. STATIONS WERE PLOTTED ON TOPO SHEETS AND DIGITIZED.

Actual/Intended Use or Purpose:

MAP COVERAGE OF SEDIMENT SITES CAN BE QUERIED TO GIVE GRAIN SIZE AND BEACH SLOPE INFORMATION TO PREDICT EROSION/DEPOSITION RATES, STORM SURGE INCURSION, TIDAL WATER ELEVATIONS AND WAVE RUN-UP CALCULATIONS.

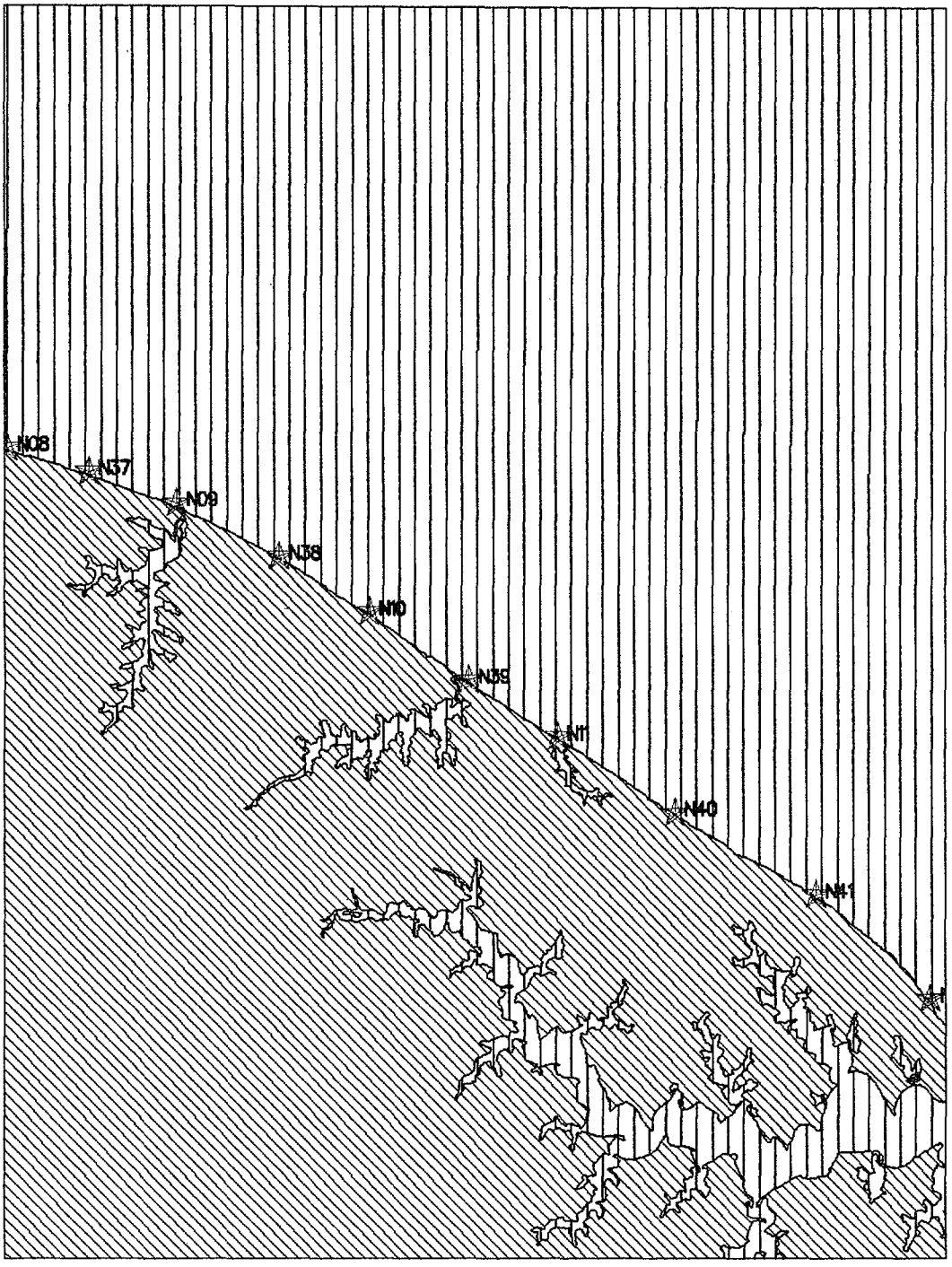
COMPREHENSIVE COASTAL INVENTORY

AVERAGE TIME AND DISC SPACE USED*

SEDIMENT INVENTORY COVERAGE

MAP NUMBER	TIME	DISC SPACE
SED5413	.25	49152
SED5414	.5	57344
SED5512	2.0	53248
SED5513	.75	57344
SED5514	.25	57344
SED5515	.25	49152
SED5612	.25	30720
SED5614	.5	57344
SED5711	.75	24576
SED5713	1.0	57344
SED5714	.5	57344
SED5810	.5	61440
SED5811	1.0	49152
SED5813	.5	57344
SED5814	.25	49152
SED5910	1.0	57344
SED5912	.5	24576
SED5913	.25	24576
SED6009	.75	57344
SED6010	1.0	49152
SED6011	.75	26624
SED6012	.75	24576
AVERAGE	.75	46918

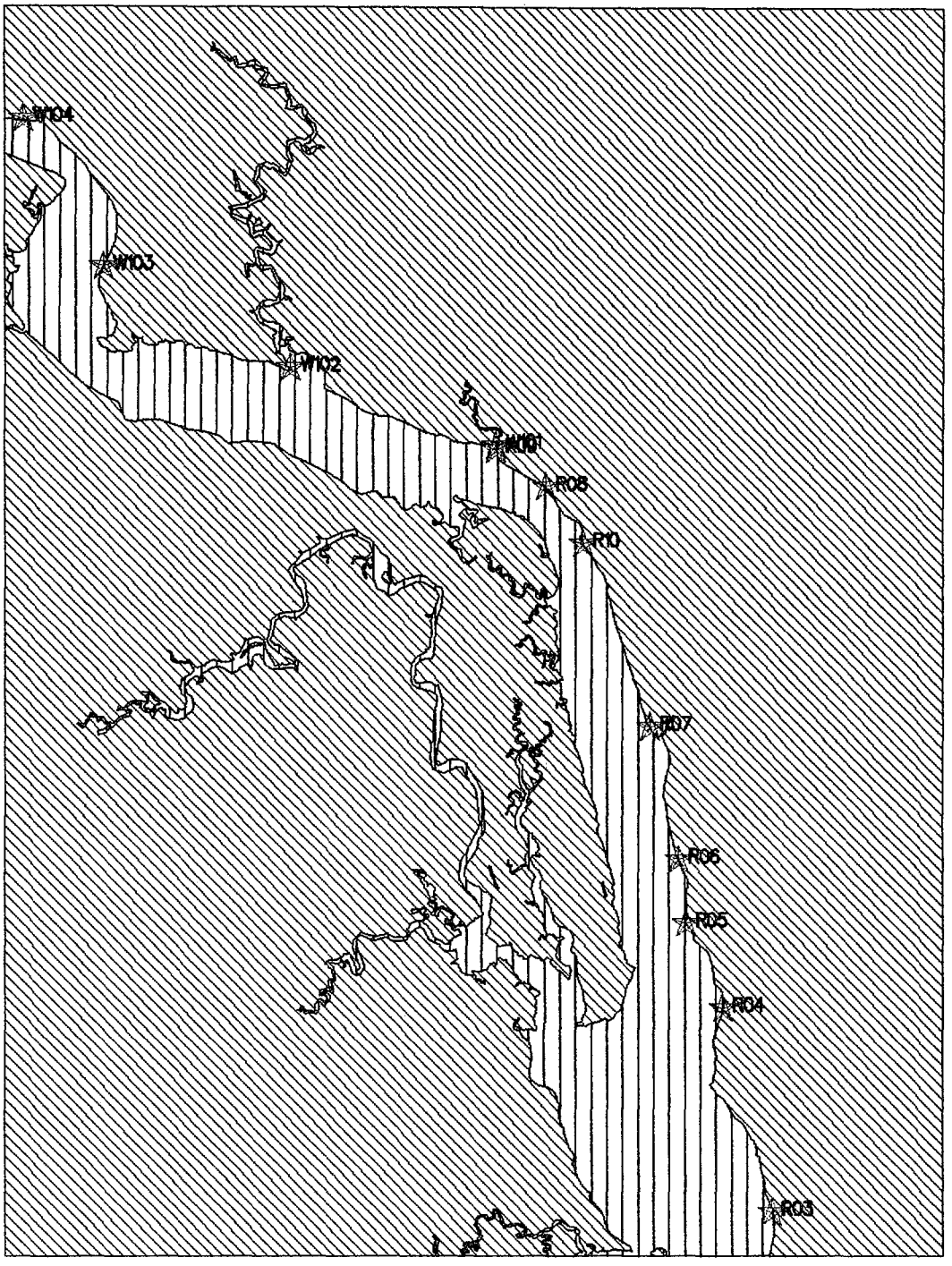
*TIME IN HOURS, DISC SPACE IN BYTES



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED6012
BURGESS QUAD

SED6012

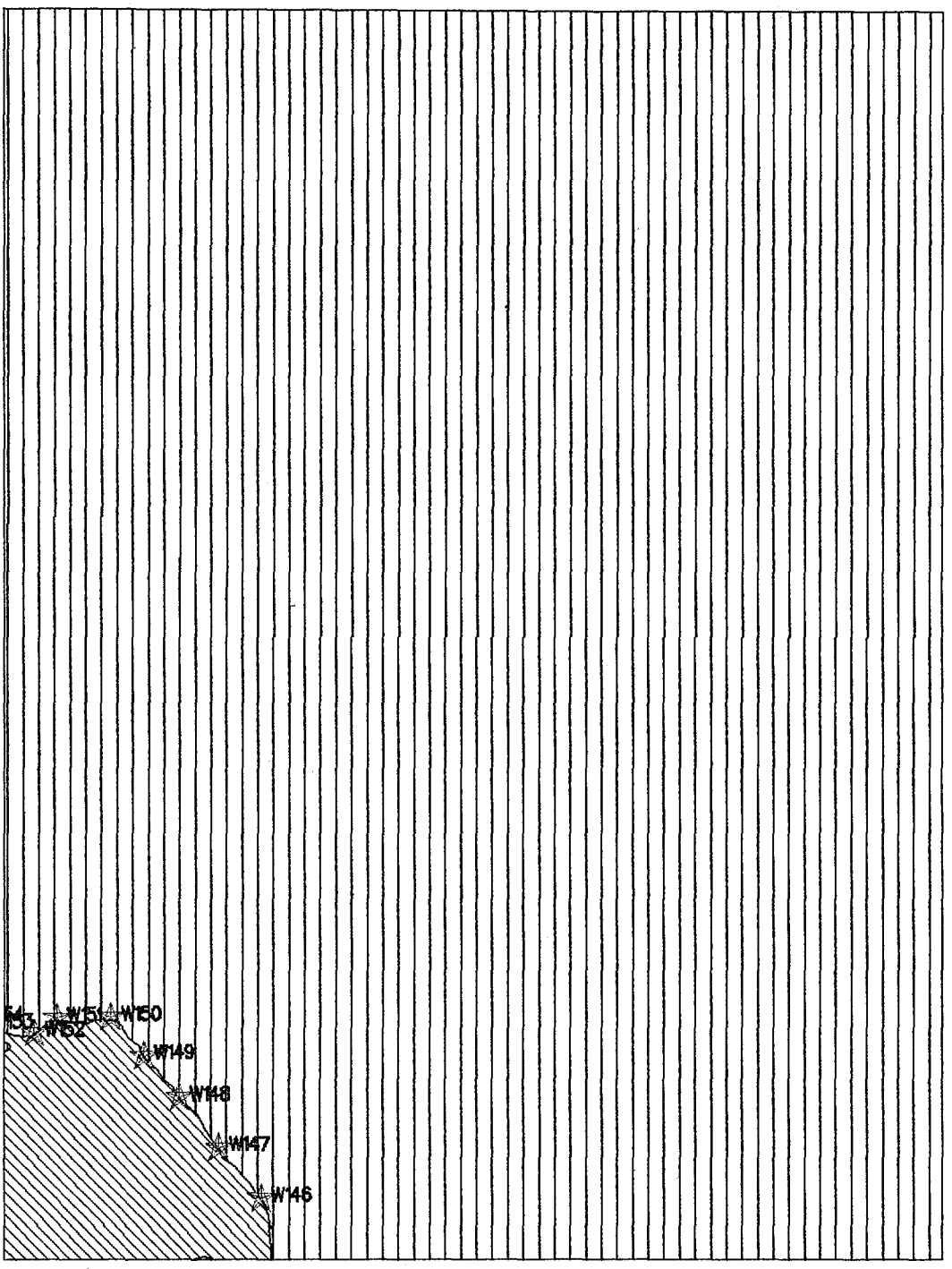
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5513
CHAMPLAIN QUAD

SED5513

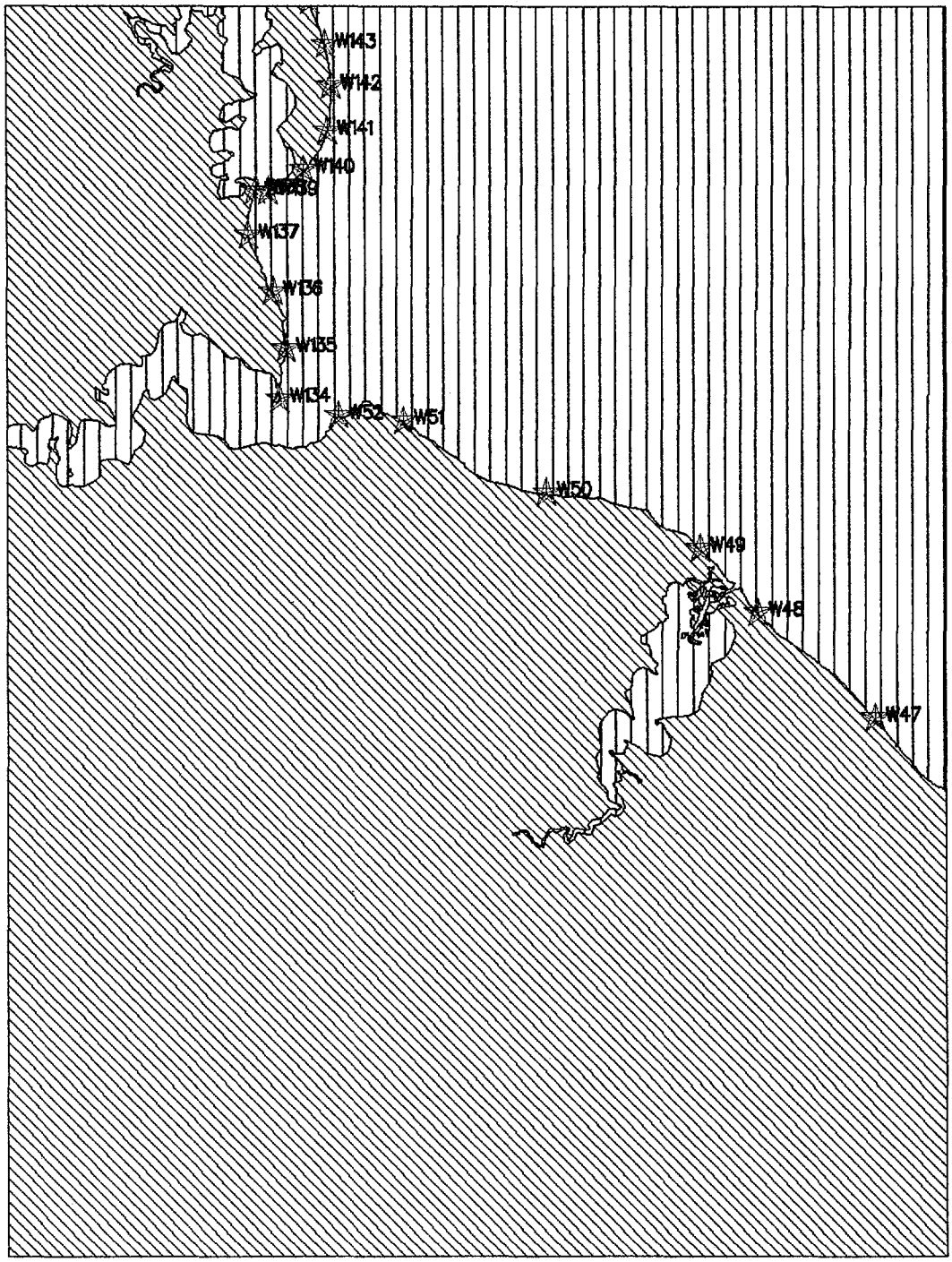
★ SAMPLE STATION
UPLAND
WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5515
COLONIAL BEACH NORTH QUAD

SED5515

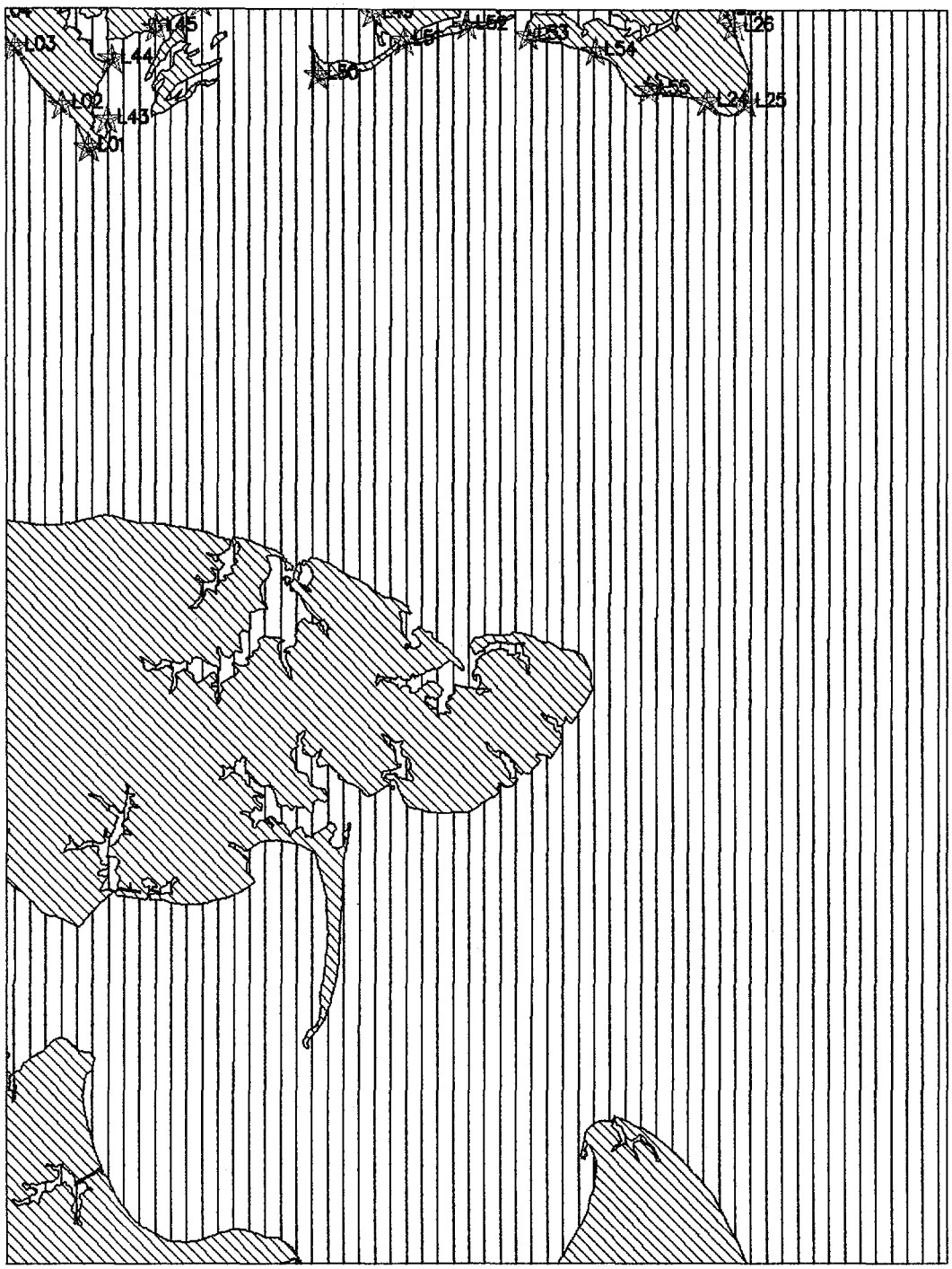
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5514
COLONIAL BEACH SOUTH QUAD

SED5514

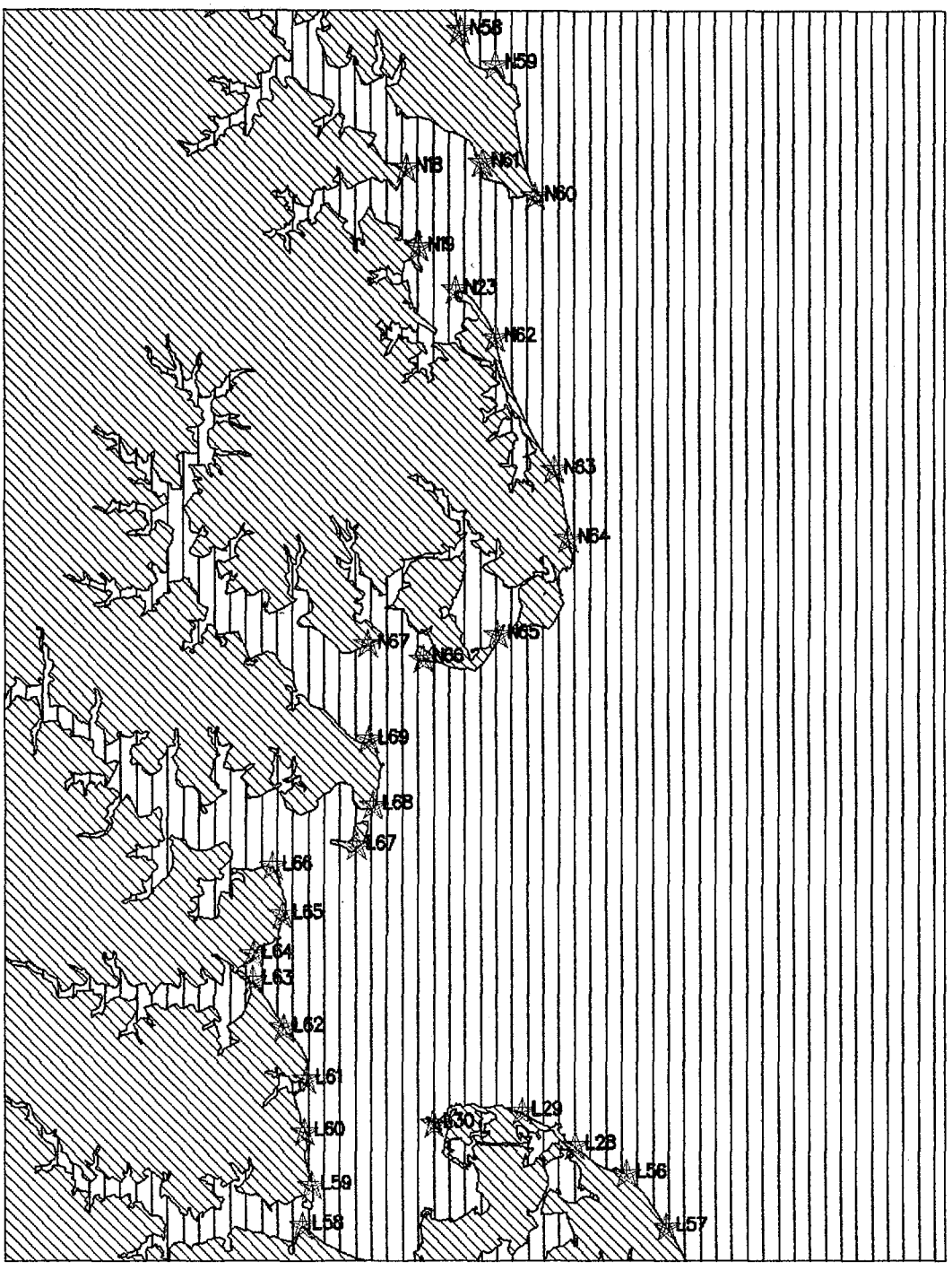
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED6009
DELTAVILLE QUAD

SED6009

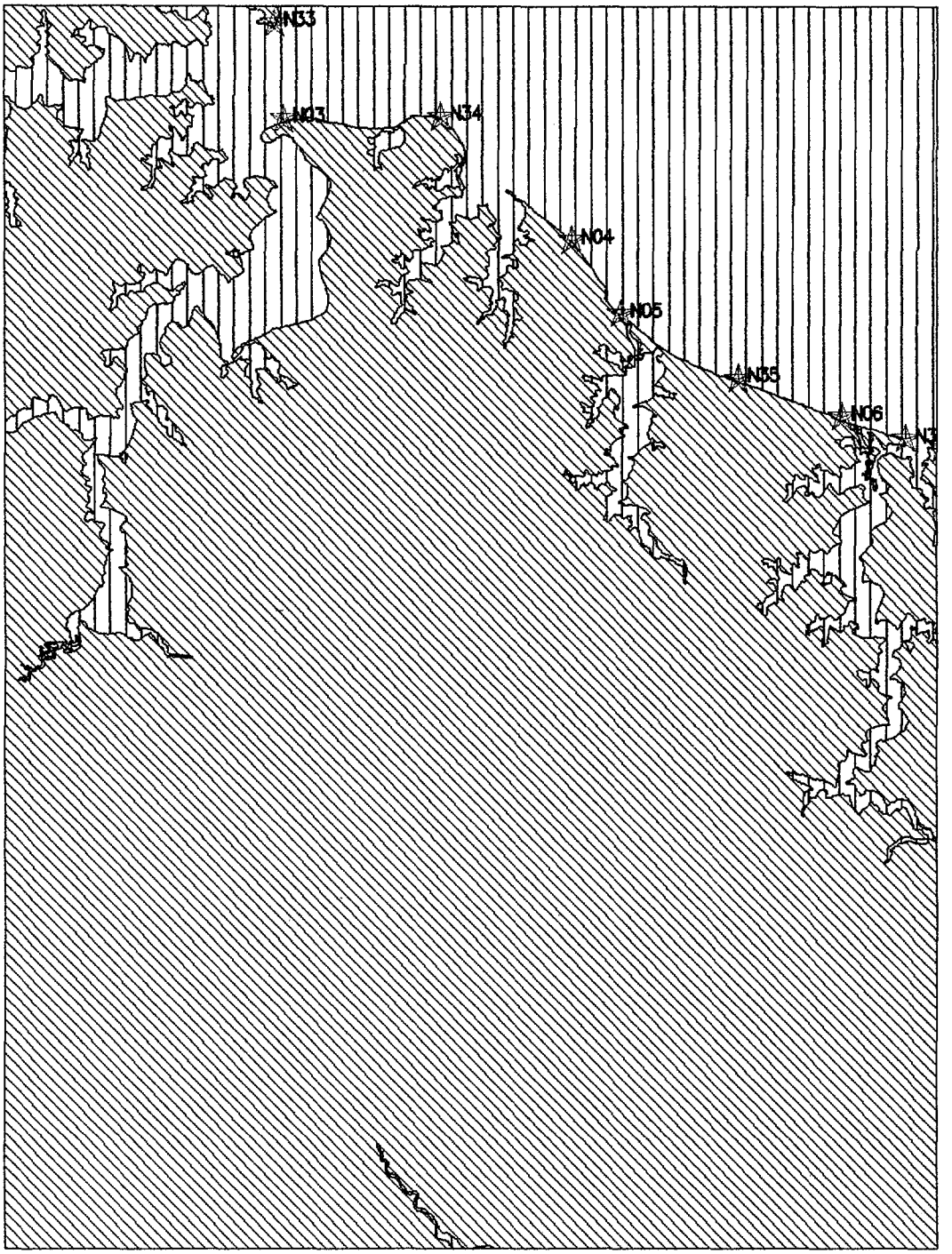
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED6010
FLEETS BAY QUAD

SED6010

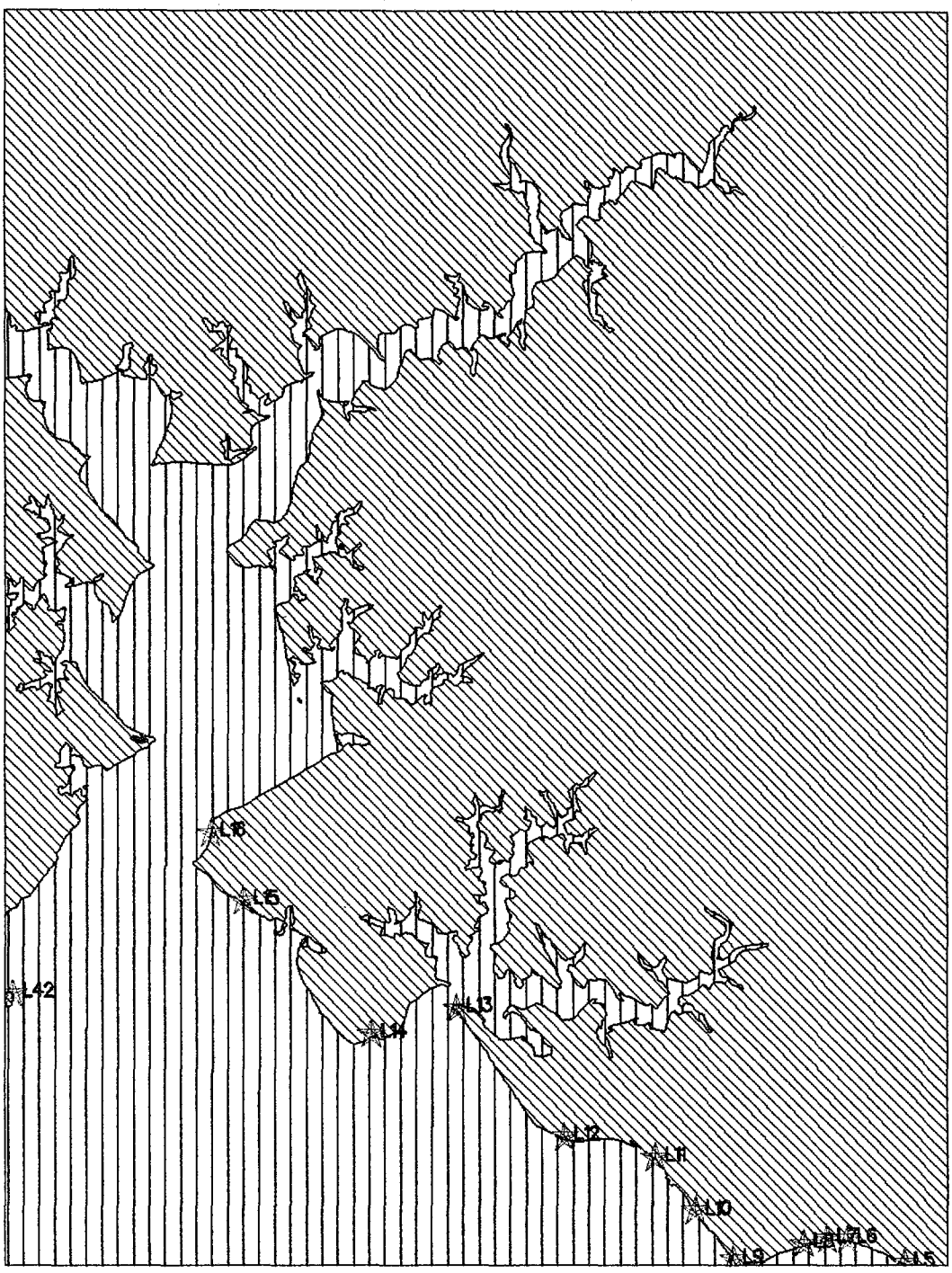
★ SAMPLE STATION
UPLAND
WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5912
HEATHSVILLE QUAD

SED5912

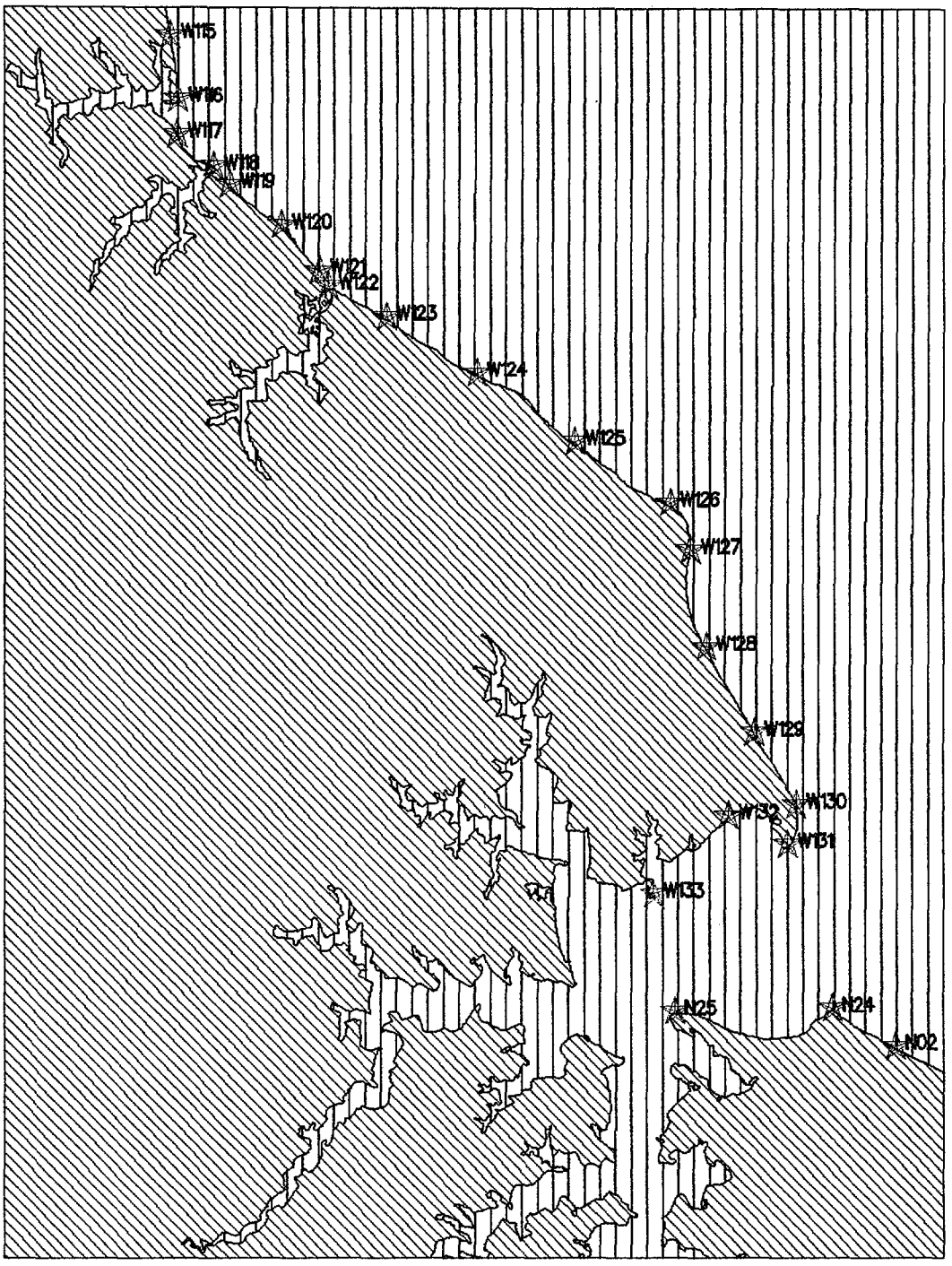
★ SAMPLE STATION
\\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5910
IRVINGTON QUAD

SED5910

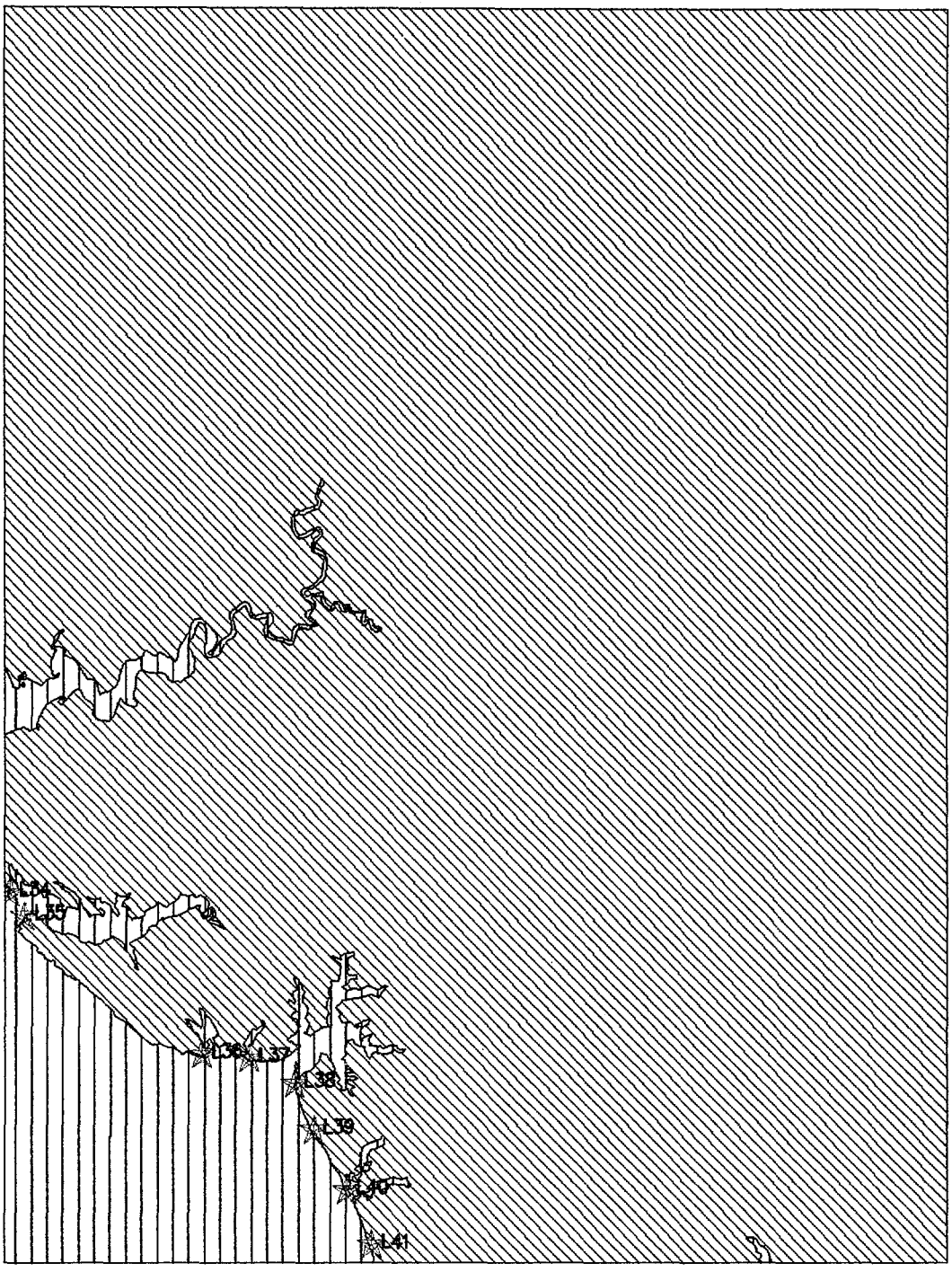
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5813
KINSALE QUAD

SED5813

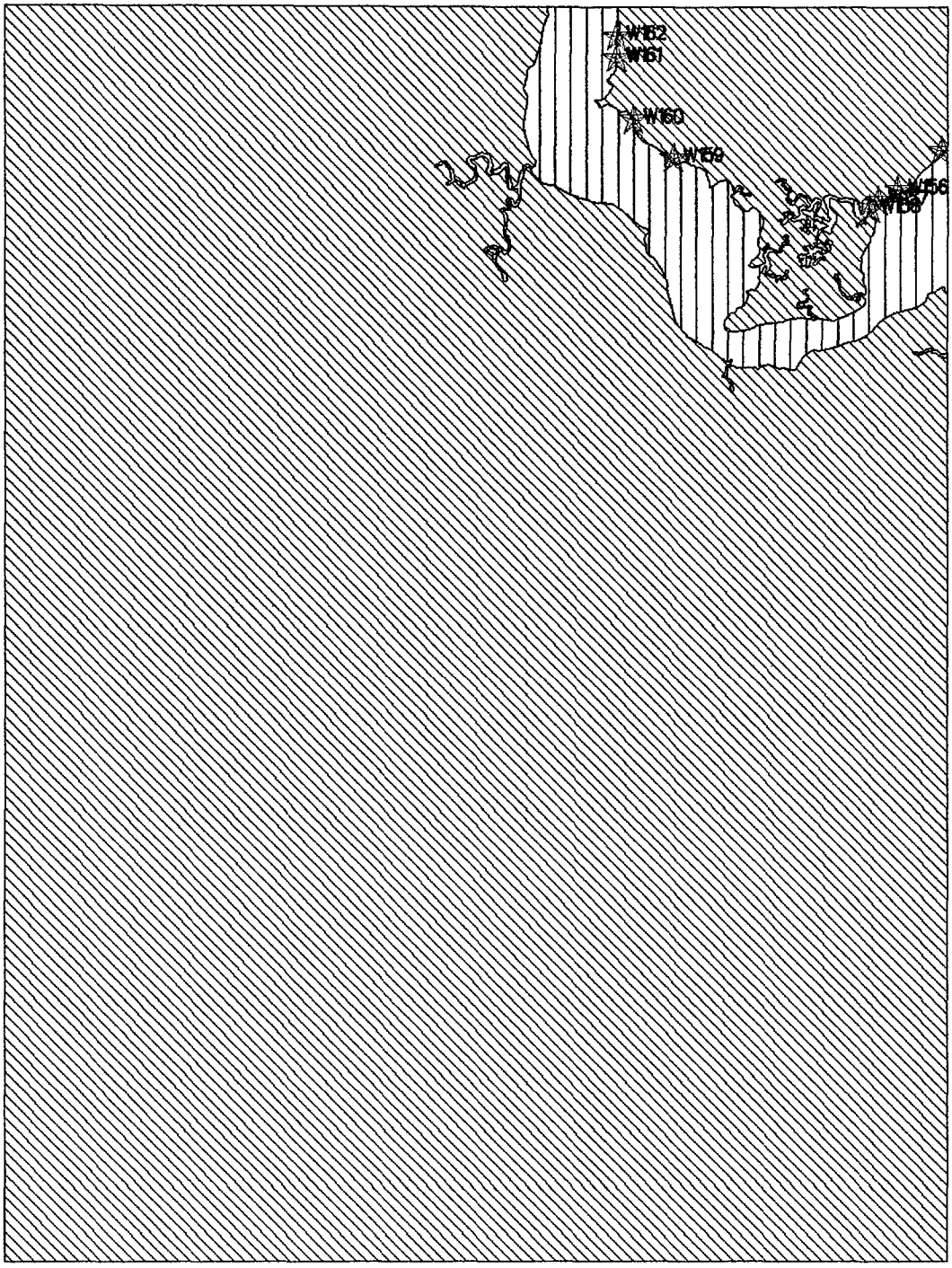
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5811
LIVELY QUAD

SED5811

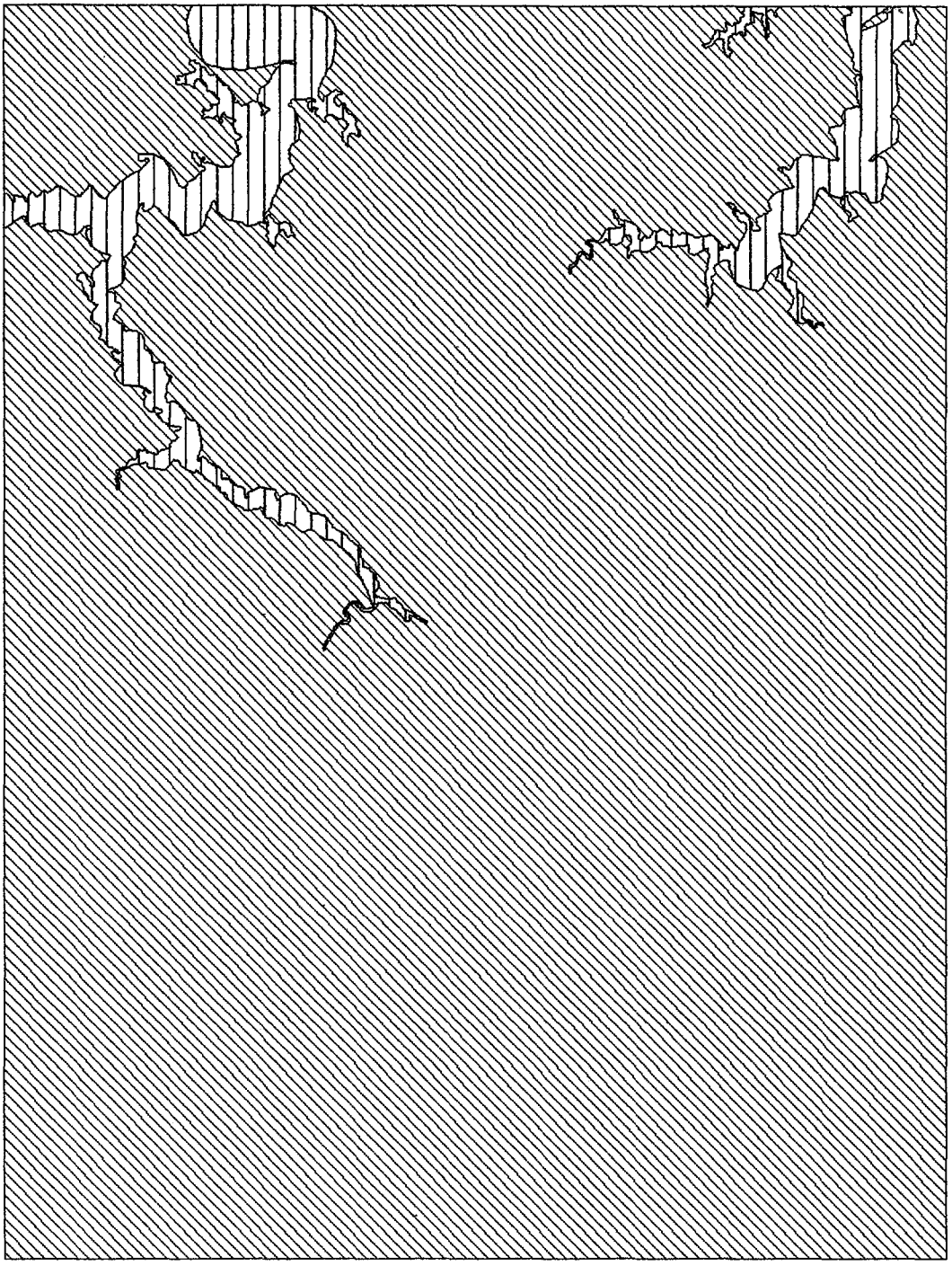
★ SAMPLE STATION
UPLAND
WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5413
LORETTO QUAD

SED5413

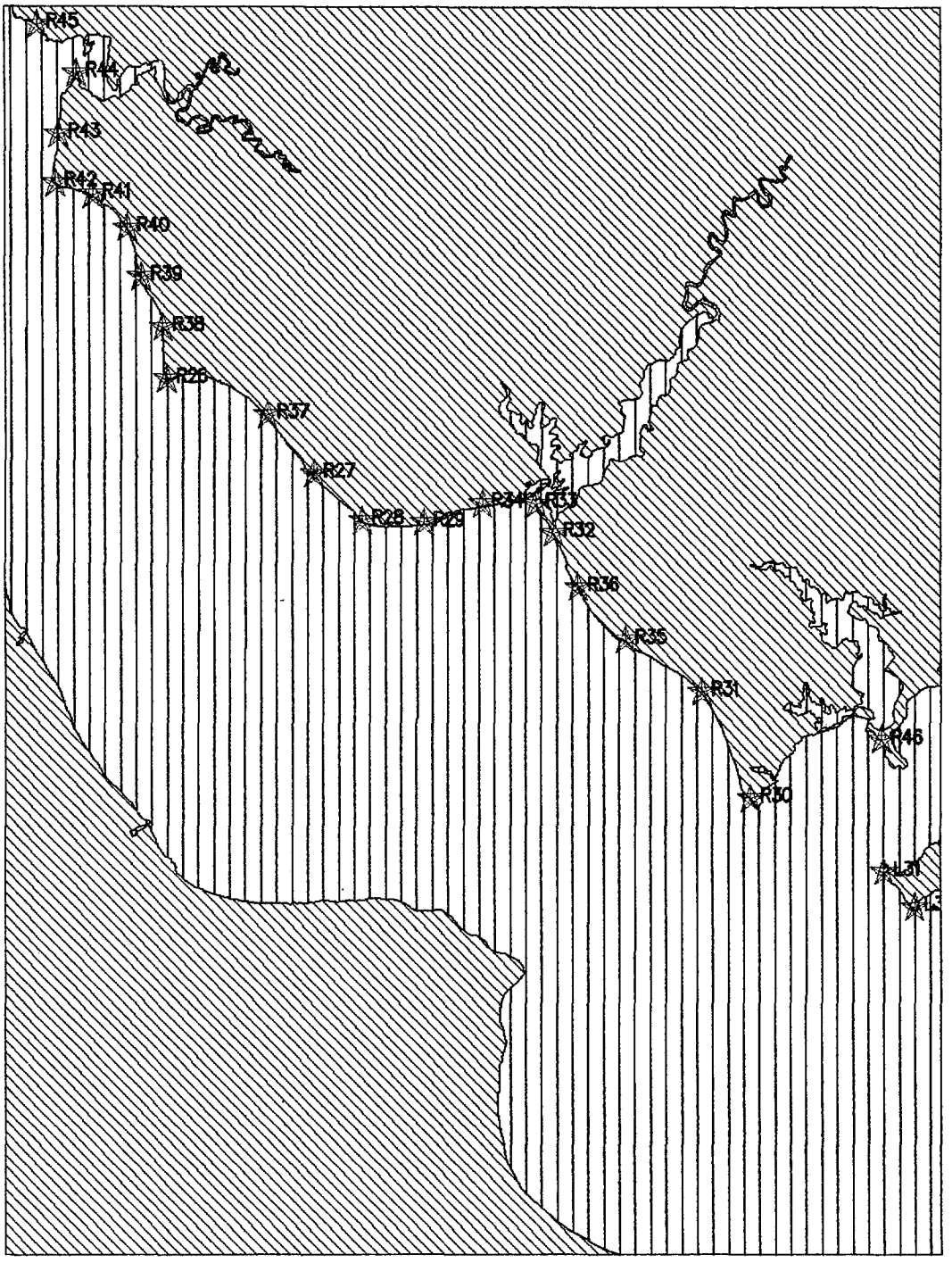
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5713
MACHODOC QUAD

SED5713

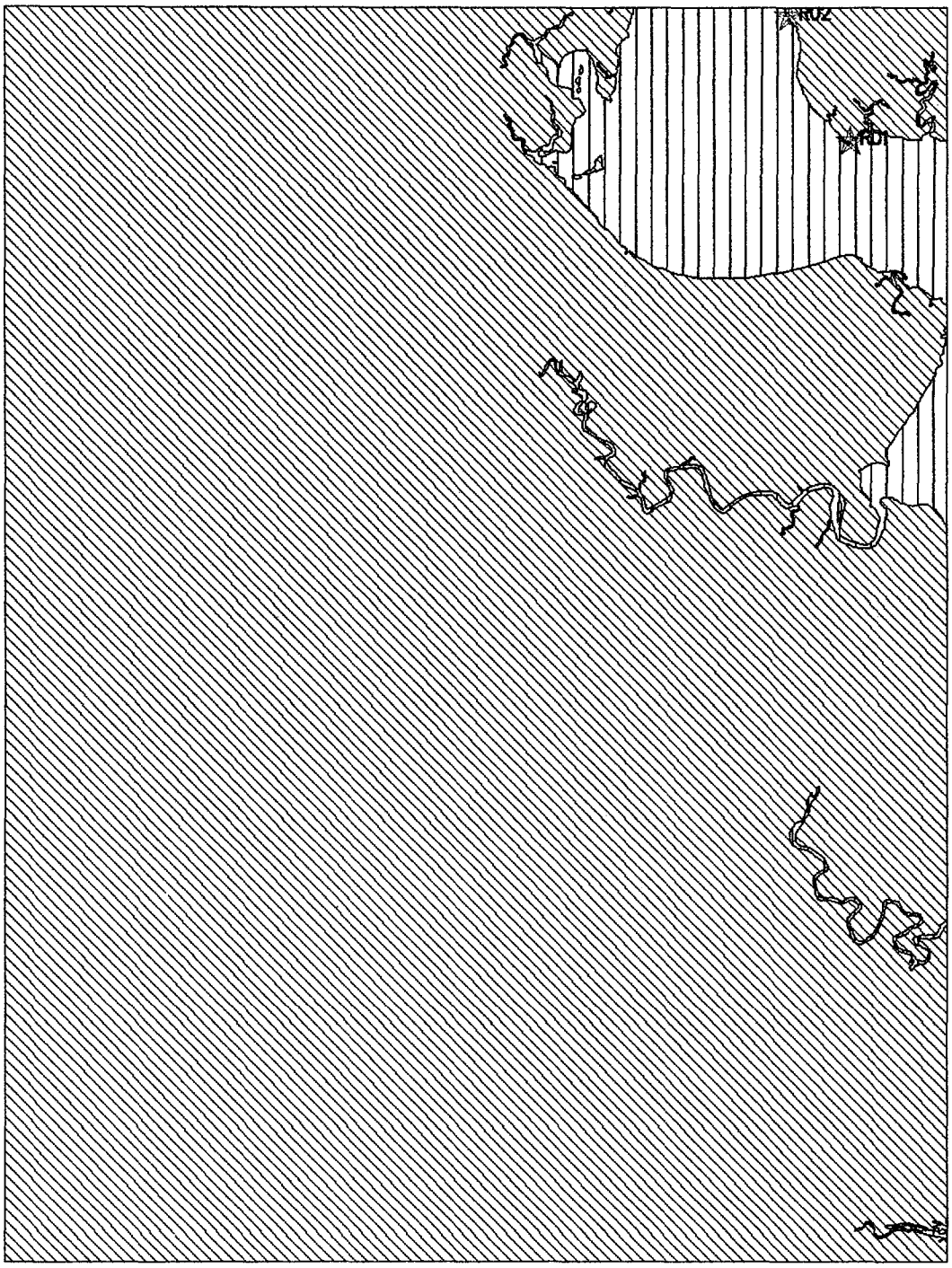
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5711
MORATTICO QUAD

SED5711

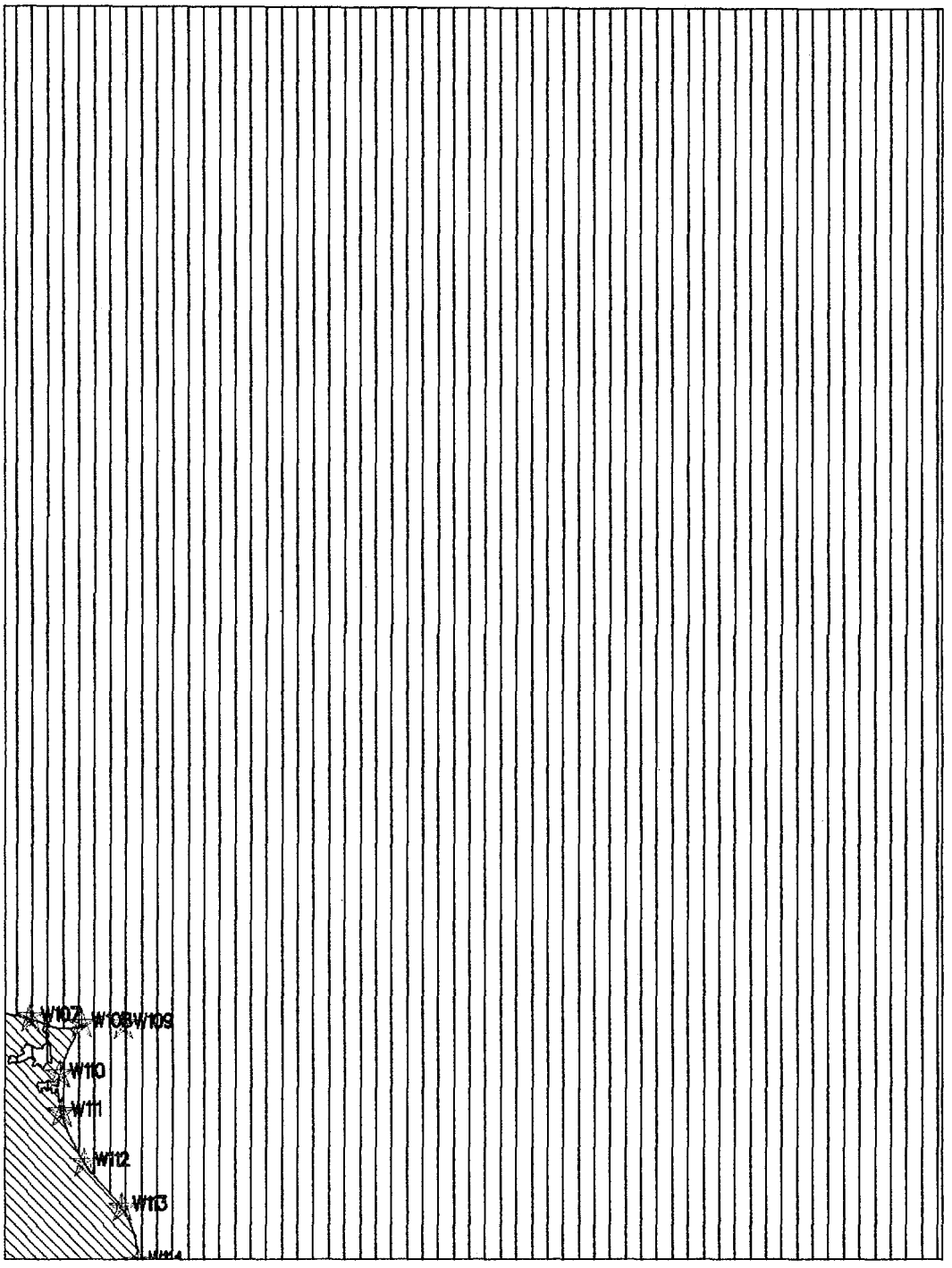
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5512
MOUNT LANDING QUAD

SED5512

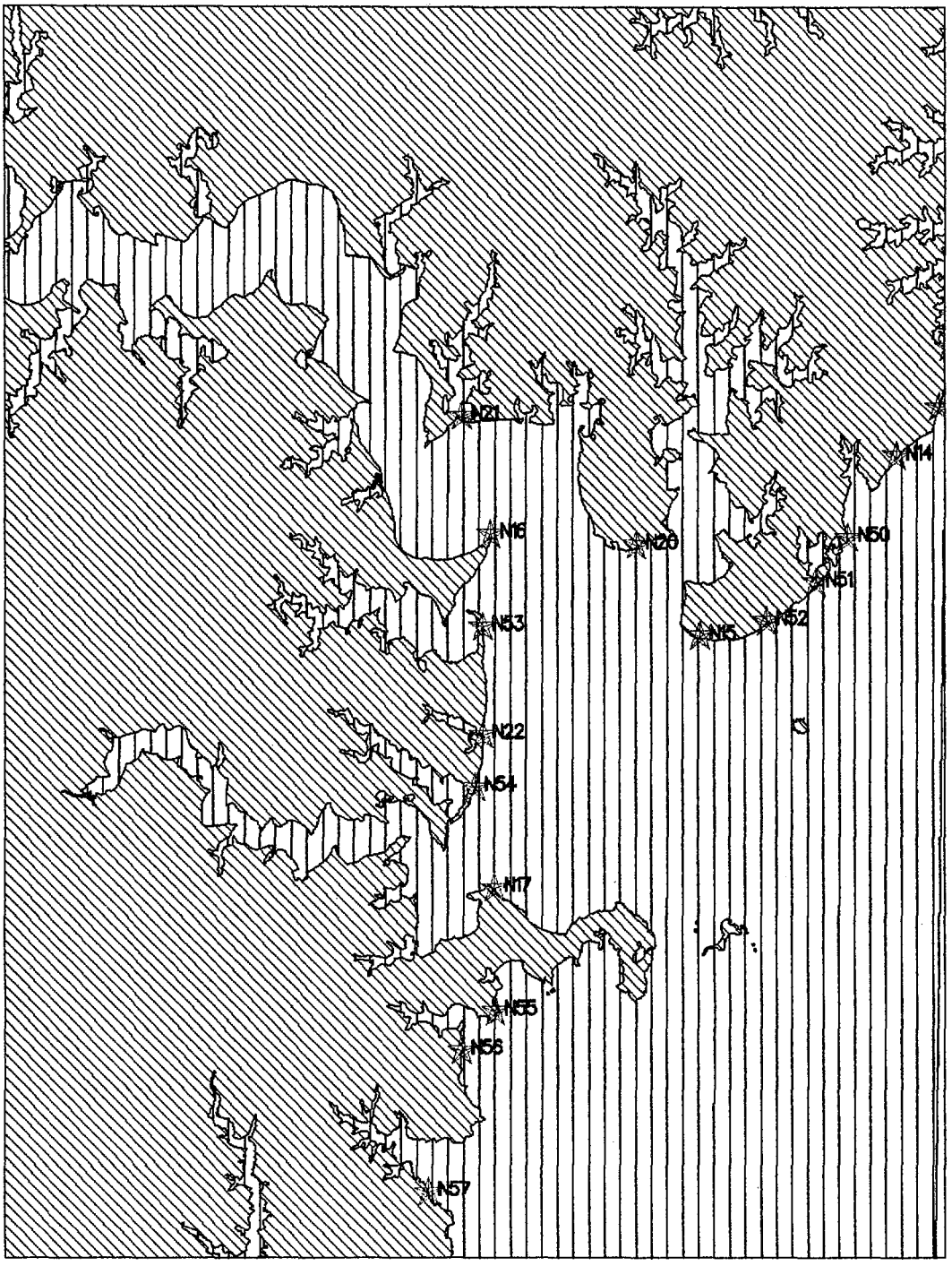
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5814
PINEY POINT QUAD

SED5814

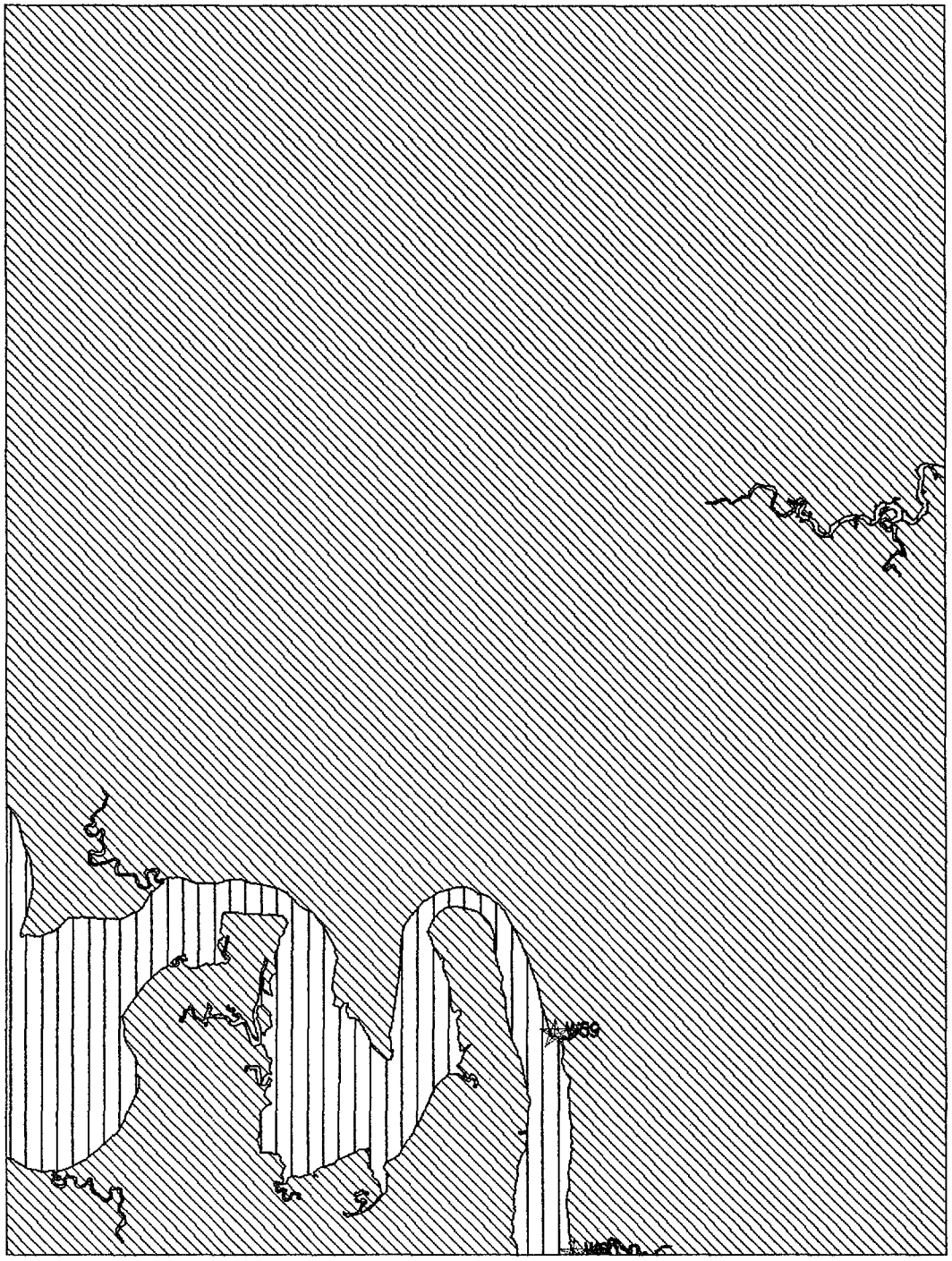
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED6011
REEDVILLE QUAD

SED6011

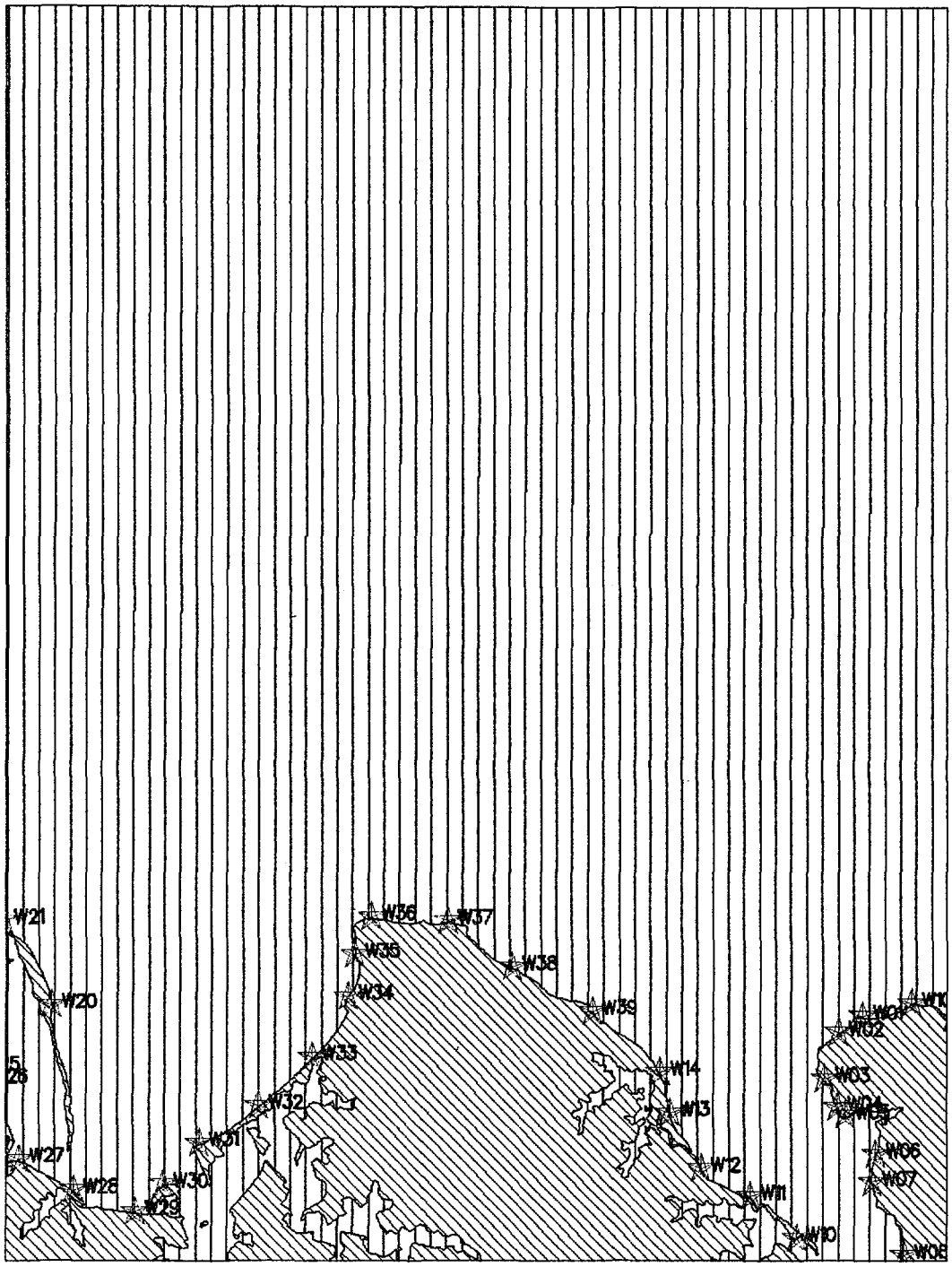
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5414
ROLLINS FORK QUAD

SED5414

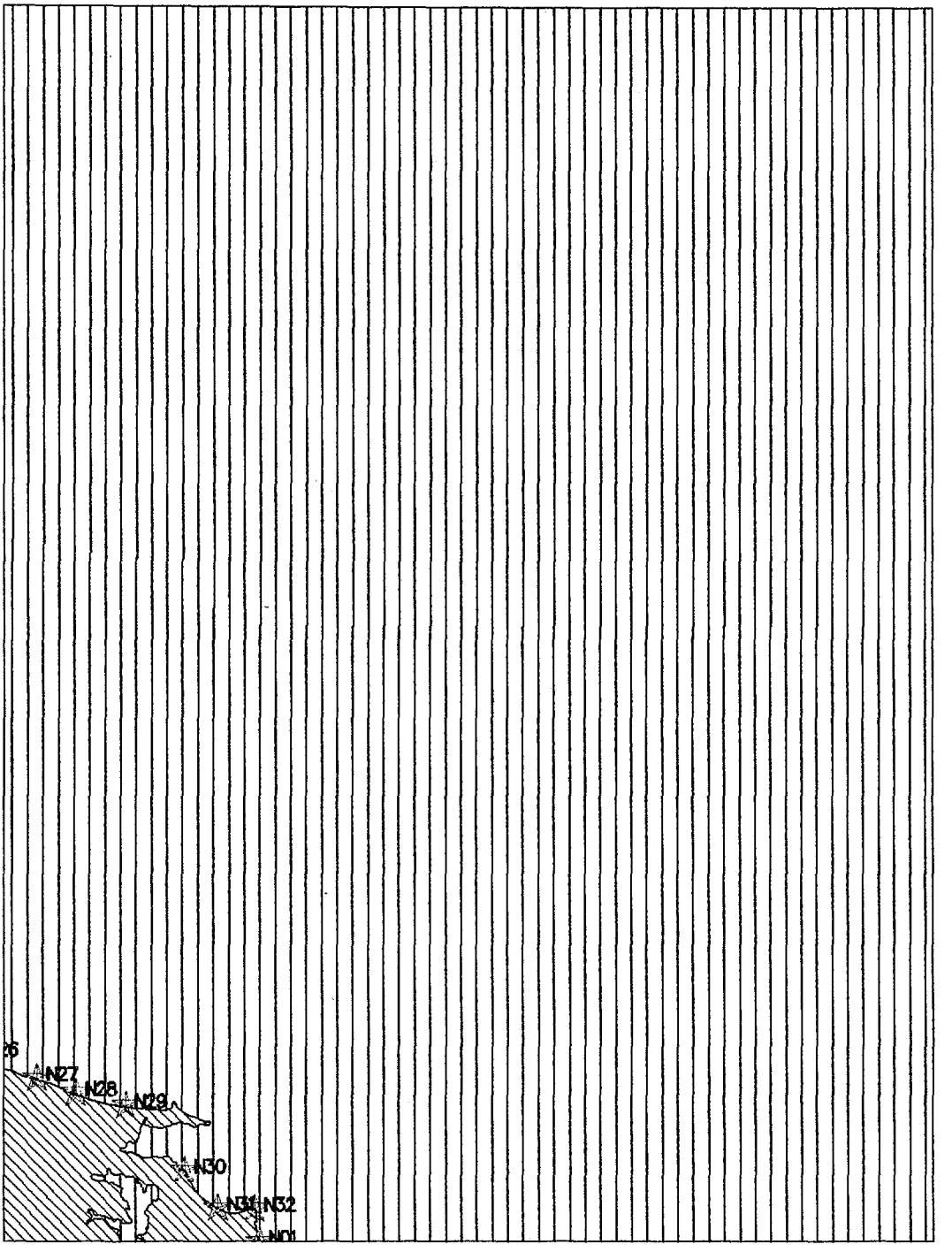
* SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5714
ST CLEMENTS ISLAND QUAD

SED5714

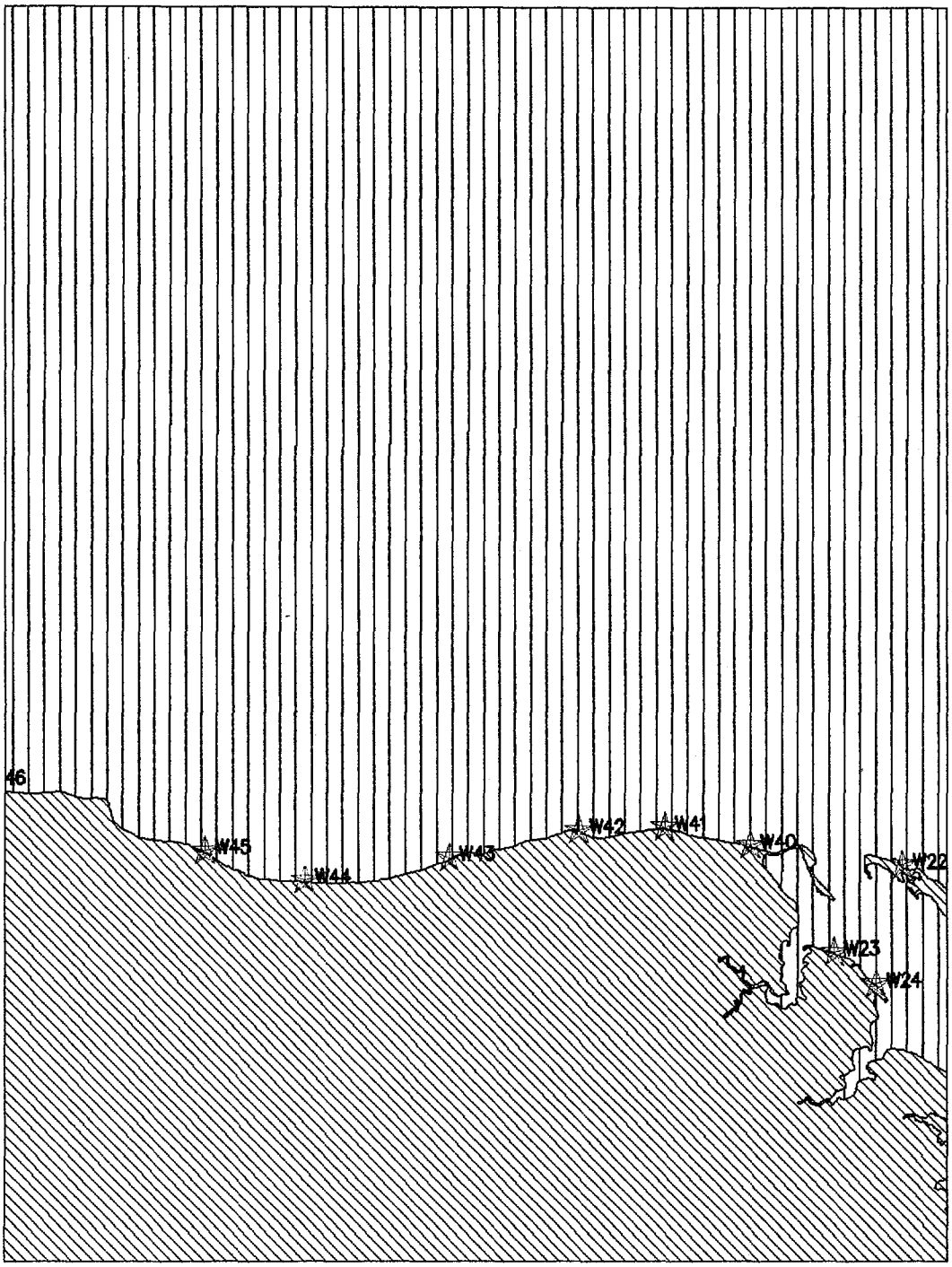
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5913
ST GEORGE ISLAND QUAD

SED5913

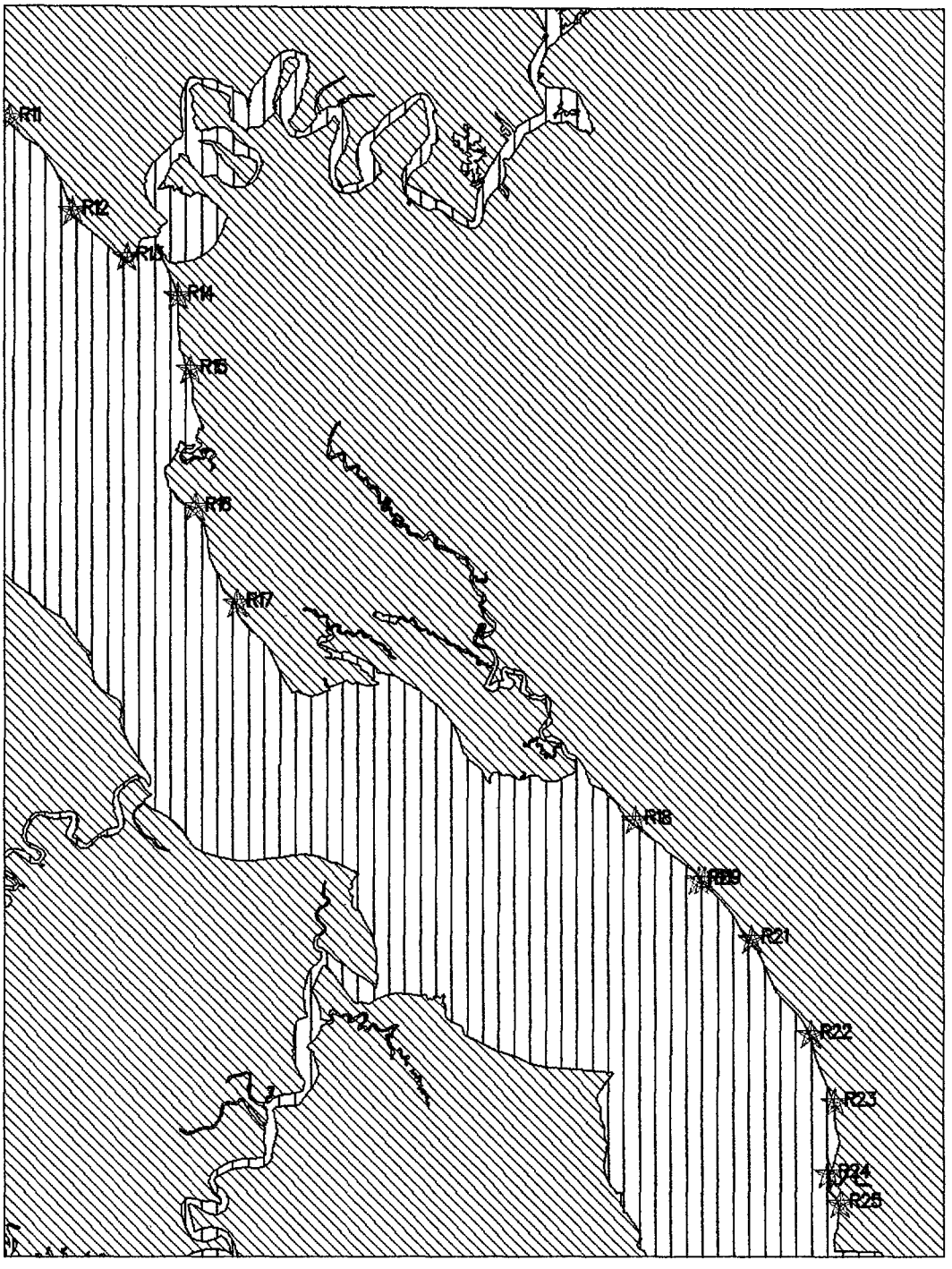
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5614
STRATFORD HALL QUAD

SED5614

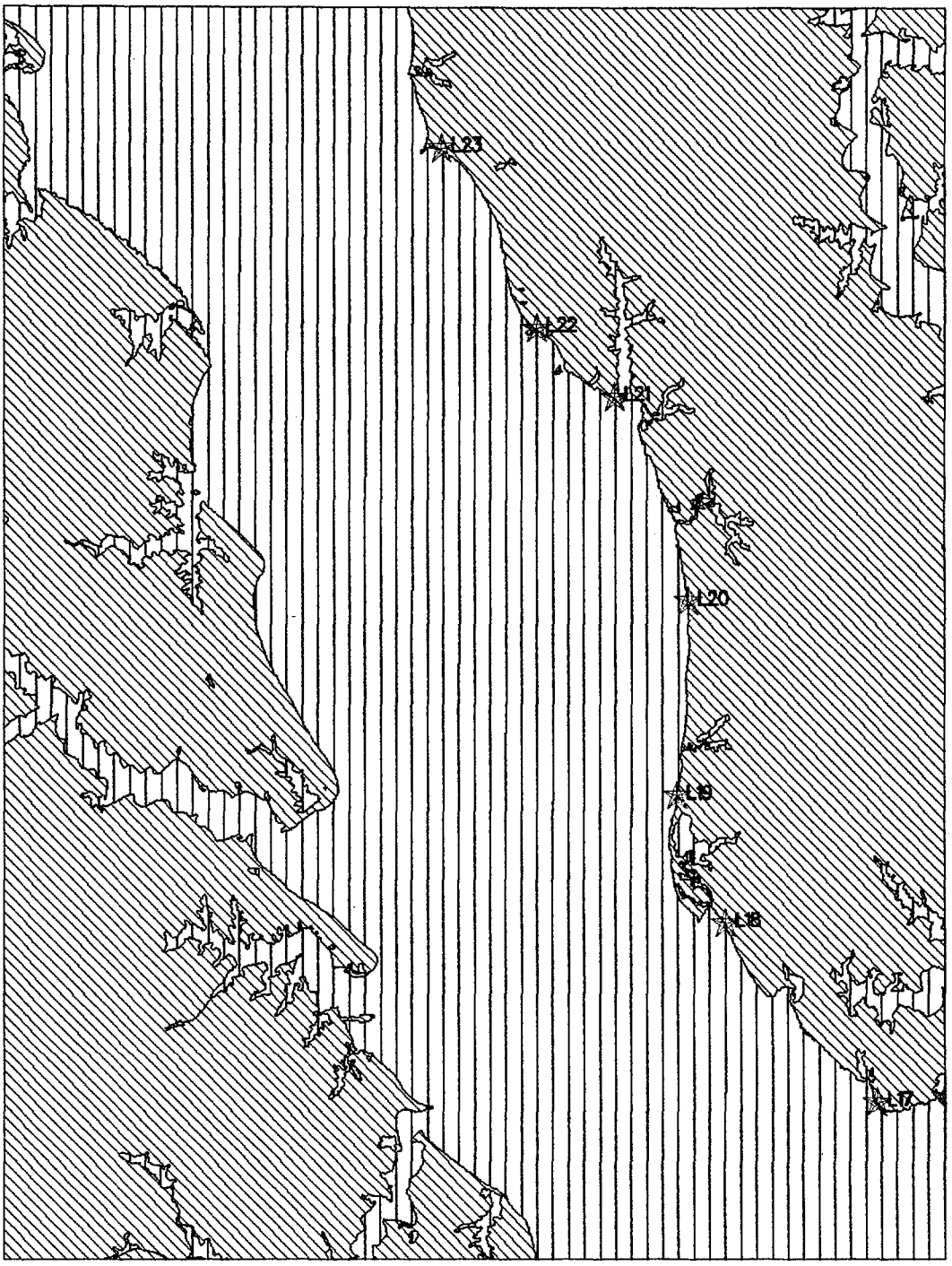
★ SAMPLE STATION
\\\ UPLAND
|| WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5612
TAPPAHANNOCK QUAD

SED5612

★ SAMPLE STATION
UPLAND
WATER



VIMS COASTAL INVENTORIES
SEDIMENT SURVEY
SED5810
URBANNA QUAD

SED5810

★ SAMPLE STATION
\\\ UPLAND
|| WATER

Table 7a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
WESTMORELAND COUNTY
FORESHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
W1	37.5	61.8	0.7	0.0
W2	43.3	56.0	0.7	0.0
W3	6.4	92.9	0.7	0.0
W4	54.9	44.6	0.5	0.0
W5	30.6	68.6	0.8	0.0
W6	16.1	83.1	0.8	0.0
W7	41.7	57.6	0.7	0.0
W8	7.3	91.4	1.3	0.0
W9	13.9	85.1	1.0	0.0
W10	7.8	91.6	0.6	0.0
W11	19.3	79.7	1.0	0.0
W12	19.6	79.6	0.8	0.0
W13	43.2	56.0	0.8	0.0
W14	40.4	58.6	1.0	0.0
W20	21.5	78.0	0.5	0.0
W21	35.2	64.4	0.4	0.0
W22	1.5	98.1	0.4	0.0
W23	39.7	59.5	0.8	0.0
W24	0.9	98.5	0.6	0.0
W25	1.2	94.4	4.4	0.0
W26	3.4	95.1	1.5	0.0
W27	2.9	95.3	1.8	0.0
W28	0.0	99.4	0.6	0.0
W29	9.2	90.4	0.4	0.0
W30	4.8	94.8	0.4	0.0
W31	15.6	83.8	0.6	0.0
W32	24.1	75.5	0.4	0.0
W33	6.9	92.6	0.5	0.0
W34	48.3	51.4	0.3	0.0
W35	13.3	86.2	0.5	0.0
W36	36.4	62.9	0.7	0.0
W37	52.9	46.7	0.4	0.0
W38	28.0	71.1	0.9	0.0
W39	23.1	76.3	0.6	0.0
W40	58.3	41.4	0.3	0.0
W41	40.0	59.4	0.6	0.0
W42	66.1	33.2	0.7	0.0
W43	26.9	72.6	0.5	0.0
W44	0.0	99.5	0.5	0.0
W45	12.2	84.1	3.7	0.0
W46	26.9	72.7	0.4	0.0

Table 7a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
WESTMORELAND COUNTY
FORESHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
W47	3.8	95.8	0.4	0.0
W48	22.5	74.1	3.4	0.0
W49	3.3	96.1	0.6	0.0
W50	27.8	71.7	0.5	0.0
W51	10.5	88.5	1.0	0.0
W52	8.9	90.0	1.1	0.0
W59	59.1	39.9	1.0	0.0
W60	26.3	71.9	1.8	0.0
W101	8.9	89.2	1.9	0.0
W102	33.3	64.2	2.5	0.0
W103	58.3	40.5	1.2	0.0
W104	0.2	98.1	1.7	0.0

Table 7b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
WESTMORELAND COUNTY
FORESHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWNESS	G_KURTOSIS	M_MEAN	M_STDEV	M_SKEW	M_KURT
W1	1.2718	1.1362	0.6257	-0.3174	0.7220	1.1218	0.6964	-0.5998	4.3659
W2	1.1147	0.9987	0.5682	-0.2314	0.7263	1.0119	0.6114	-0.0110	4.4987
W3	1.3979	1.3651	0.3456	-0.2492	0.4963	1.3214	0.4611	-1.7750	9.9042
W4	1.0903	0.9371	0.6239	-0.3413	0.7649	0.9654	0.6358	-0.2046	4.1549
W5	1.1148	1.0408	0.5770	-0.1149	0.7471	1.0634	0.5995	0.0222	3.8523
W6	0.7696	0.7199	0.6748	-0.1367	0.8083	0.7065	0.6909	-0.1205	2.7485
W7	1.1853	1.1132	0.5733	-0.1324	0.7255	1.1463	0.5907	0.1156	4.3104
W8	1.1287	1.0504	0.5427	-0.2896	0.7954	1.0274	0.5728	-0.6749	4.1354
W9	0.8963	1.0304	1.0289	0.1281	0.7609	1.0177	0.9680	0.1135	2.1891
W10	0.9327	0.8121	0.7568	-0.1698	0.7768	0.8572	0.7240	-0.0826	2.6179
W11	0.8169	0.8234	0.5051	0.0274	0.8808	0.8321	0.5642	0.6555	5.5918
W12	1.0104	0.8353	0.6472	-0.3571	0.7271	0.8661	0.6681	-0.1041	3.8087
W13	0.8902	0.8141	0.5131	-0.2620	0.8043	0.8225	0.5970	0.2310	6.7119
W14	0.7440	0.6555	0.6855	-0.1554	0.7666	0.6766	0.6846	0.0091	2.9637
W20	0.1460	0.0575	0.4901	-0.2388	1.2235	0.0533	0.5445	0.8694	6.9049
W21	-0.1726	-0.1934	0.4283	-0.0640	1.8378	-0.1504	0.4999	1.2024	8.6459
W22	0.5115	0.5307	0.4007	0.0262	0.8173	0.5476	0.4770	1.4610	10.3546
W23	0.7979	1.0065	1.1384	0.2465	1.0988	0.9243	1.0105	0.6410	2.5830
W24	0.9224	0.9076	0.4273	-0.0876	0.6787	0.9121	0.4878	0.4855	6.1871
W25	0.8743	1.0344	0.6704	0.3739	0.8489	1.0485	0.6840	0.7991	3.2988
W26	0.8832	0.8757	0.4975	-0.0492	0.7704	0.8705	0.5498	-0.0292	5.1268
W27	1.4472	1.5007	0.8792	0.0120	0.6118	1.4714	0.8704	-0.1383	2.4234
W28	1.0217	1.0684	0.4608	0.1452	0.6320	1.0684	0.4900	0.3836	4.4473
W29	0.4958	0.4368	0.7320	-0.0199	1.2879	0.5118	0.7546	0.7147	4.6317
W30	0.7961	0.7906	0.3582	-0.0290	0.6528	0.8112	0.4455	1.1283	8.9187
W31	0.5993	0.5574	0.7014	0.0580	1.3959	0.6232	0.7351	1.0133	5.2784

Table 7b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
WESTMORELAND COUNTY
FORESHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
W32	0.9495	0.9900	0.5939	0.2172	0.9429	1.0384	0.6451	1.0202	5.1440
W33	0.9663	0.9921	0.7236	0.1064	1.0488	1.0330	0.7198	0.4920	3.6153
W34	0.9882	0.9749	0.5612	-0.0372	0.6818	0.9801	0.6341	0.0123	4.3824
W35	1.2212	1.1897	0.4707	-0.1905	0.6698	1.1531	0.5351	-1.1216	6.1884
W36	0.8683	0.8259	0.4850	-0.0708	0.7640	0.8467	0.5394	0.1024	4.7719
W37	0.6777	0.5105	0.7516	-0.2776	0.9594	0.5625	0.8005	0.3633	4.3660
W38	1.1296	1.0789	0.5610	-0.2102	0.8896	1.0587	0.5822	-0.6143	4.2596
W39	0.9230	0.8829	0.4065	-0.2122	0.7241	0.8743	0.4436	-0.0954	5.2938
W40	0.3265	0.2287	0.8316	0.0270	1.4474	0.3448	0.8723	1.1182	4.8838
W41	0.5346	0.4647	0.8323	0.0010	1.1018	0.5495	0.8683	0.7498	4.0120
W42	0.5379	0.5061	0.8397	0.1140	1.4485	0.6184	0.8919	1.1311	4.5506
W43	0.3282	0.2893	0.4896	-0.0431	1.0783	0.3747	0.7133	2.3285	11.5625
W44	1.0316	1.0964	0.3553	0.3249	0.5253	1.1215	0.4343	1.5964	9.3600
W45	0.9118	0.8282	0.8657	-0.1371	1.0303	0.8511	0.8609	0.0216	3.3433
W46	-0.1757	-0.1905	0.4394	0.0137	2.1910	-0.1582	0.4907	1.6710	10.5263
W47	0.6854	0.6160	0.4365	-0.2294	0.7480	0.6295	0.4927	0.5881	7.8986
W48	0.8812	0.7661	0.8413	-0.1433	0.8466	0.8024	0.8858	0.3885	3.4143
W49	0.8477	0.6594	0.6750	-0.3428	0.7104	0.6623	0.7363	0.3208	3.8131
W50	0.8416	0.7253	0.4392	-0.4454	0.7825	0.7502	0.5605	0.8184	9.2915
W51	1.1545	1.1246	0.5408	-0.1039	0.8023	1.1179	0.5990	-0.1867	4.8073
W52	1.2130	1.1598	0.6389	-0.2401	0.8800	1.1193	0.6725	-0.9459	4.6325
W59	0.8589	0.8344	0.7422	0.0145	1.0958	0.8684	0.7678	0.5832	4.4084
W60	0.5845	0.5543	0.8587	0.0919	1.3360	0.6416	0.8738	1.0077	4.7568
W101	0.4948	0.5583	0.7600	0.1402	0.7889	0.6042	0.8147	0.8285	4.1308
W102	1.3860	1.1854	0.7877	-0.3802	0.7107	1.2050	0.8091	-0.4215	3.1595
W103	0.9181	0.7762	0.7410	-0.2757	0.8021	0.7886	0.7510	-0.1412	3.2338
W104	0.8794	0.8689	0.5203	-0.0249	0.6518	0.8762	0.5712	0.1570	4.6656

Table 8a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
WESTMORELAND COUNTY
BACKSHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
W1	2.5	96.6	0.9	0.0
W2	88.4	10.6	1.0	0.0
W3	0.0	98.9	1.1	0.0
W4	33.5	65.7	0.8	0.0
W5	4.7	94.9	0.4	0.0
W6	0.0	98.9	1.1	0.0
W7	1.4	97.6	1.0	0.0
W8	5.9	93.4	0.7	0.0
W9	0.5	98.5	1.0	0.0
W10	0.0	99.1	0.9	0.0
W11	0.0	99.4	0.6	0.0
W12	18.9	80.7	0.4	0.0
W13	0.2	99.1	0.7	0.0
W14	0.0	98.7	1.3	0.0
W20	5.4	94.0	0.6	0.0
W21	0.8	98.4	0.8	0.0
W22	0.0	99.7	0.3	0.0
W23	0.0	99.1	0.9	0.0
W24	0.0	99.7	0.3	0.0
W25	0.0	99.4	0.6	0.0
W26	0.0	99.1	0.9	0.0
W27	0.0	98.4	1.6	0.0
W28	2.7	96.6	0.7	0.0
W29	0.0	98.8	1.2	0.0
W30	0.0	99.6	0.4	0.0
W31	0.0	99.6	0.4	0.0
W32	0.0	99.3	0.7	0.0
W33	0.1	99.2	0.7	0.0
W34	3.0	96.5	0.5	0.0
W35	64.1	35.6	0.3	0.0
W36	0.0	99.4	0.6	0.0
W37	47.6	52.1	0.3	0.0
W38	0.0	99.1	0.9	0.0
W39	13.5	86.1	0.4	0.0
W40	10.3	89.5	0.2	0.0
W41	3.4	95.9	0.7	0.0
W42	0.4	99.1	0.5	0.0
W43	0.0	99.5	0.5	0.0
W44	46.8	52.7	0.5	0.0

Table 8a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
WESTMORELAND COUNTY
BACKSHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
W45	9.5	75.6	14.9	0.0
W46	0.1	99.5	0.4	0.0
W47	30.6	69.1	0.3	0.0
W48	1.0	98.5	0.5	0.0
W49	41.1	58.4	0.5	0.0
W50	0.0	99.6	0.4	0.0
W51	0.0	99.3	0.7	0.0
W52	0.2	99.3	0.5	0.0
W59	0.0	98.4	1.6	0.0
W60	0.0	98.2	1.8	0.0
W101	0.3	97.1	2.6	0.0
W102	2.3	94.6	3.1	0.0
W104	2.7	95.5	1.8	0.0

Table 8b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
WESTMORELAND COUNTY
BACKSHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
W1	1.5752	1.6091	0.2894	0.1814	0.3466	1.6079	0.3212	0.0567	6.6958
W2	1.1848	1.1380	0.6741	-0.0350	0.8700	1.1655	0.6869	0.3068	3.6100
W3	1.4727	1.4775	0.2445	0.0246	0.3288	1.4707	0.3292	-1.3127	17.5485
W4	1.2176	1.1851	0.3740	-0.1427	0.5465	1.1694	0.4807	-0.8045	8.4677
W5	1.4962	1.5221	0.3065	0.1321	0.3739	1.5151	0.3835	-1.1542	13.4765
W6	1.2617	1.2579	0.3968	0.0002	0.5430	1.2575	0.4250	0.0426	4.6310
W7	1.4565	1.4885	0.3142	0.2123	0.4187	1.4884	0.4024	-1.0535	12.3006
W8	1.4300	1.4332	0.3831	0.0078	0.4383	1.4283	0.4245	-0.2558	6.6903
W9	1.7190	1.7097	0.5261	-0.0157	0.4246	1.7041	0.5448	-0.1810	3.2575
W10	1.7668	1.7609	0.2626	-0.0444	0.2849	1.7518	0.3489	-1.4224	16.7051
W11	1.2387	1.2737	0.3047	0.1988	0.4467	1.2772	0.3701	0.0679	10.2750
W12	1.0282	1.0328	0.3920	0.0025	0.5772	1.0305	0.4501	0.3943	7.5239
W13	1.2824	1.2665	0.3667	-0.1351	0.5276	1.2565	0.4162	-0.3605	7.5968
W14	1.4070	1.4391	0.3773	0.1662	0.4476	1.4534	0.4379	0.7370	6.7789
W20	0.2108	0.1639	0.5188	-0.1429	0.9577	0.1817	0.5669	0.6927	6.1046
W21	0.5619	0.5129	0.3699	-0.1865	0.7346	0.5160	0.4195	0.6256	8.3426
W22	1.1627	1.1413	0.2371	-0.1173	0.3947	1.1429	0.3072	-0.5477	11.5244
W23	1.6082	1.7412	0.6185	0.2945	0.4739	1.7317	0.6469	0.2337	3.9977
W24	1.1248	1.1409	0.2906	0.1124	0.4545	1.1488	0.3560	0.4065	10.1915
W25	1.3258	1.3487	0.3118	0.1298	0.4146	1.3478	0.3584	-0.3688	10.2952
W26	1.4172	1.3942	0.3437	-0.1170	0.4434	1.3854	0.3902	-0.5995	6.5968
W27	1.2098	1.3228	0.5263	0.3270	0.5816	1.3230	0.5542	0.5476	4.0529
W28	0.5939	0.6508	0.5882	0.1636	0.9887	0.6632	0.5989	0.6473	3.6271
W29	1.0942	1.0746	0.5587	-0.0430	0.6597	1.0731	0.5881	-0.0643	3.7902
W30	1.2913	1.2979	0.2504	0.0584	0.3614	1.2978	0.2968	-0.4514	11.6451
W31	1.0423	1.0652	0.3230	0.1433	0.4937	1.0772	0.3980	0.9386	9.4694

Table 8b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
WESTMORELAND COUNTY
BACKSHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
W32	1.3522	1.3800	0.3648	0.1694	0.4784	1.3978	0.4508	0.5729	8.7806
W33	1.2561	1.3679	0.6138	0.2560	0.5804	1.3595	0.6290	0.2939	3.6052
W34	1.5645	1.5749	0.2860	0.0803	0.3423	1.5811	0.3798	-0.6618	15.8557
W35	1.3886	1.4080	0.3041	0.0699	0.4036	1.3971	0.3877	-0.4322	10.7078
W36	1.5458	1.5658	0.4247	0.0043	0.4029	1.5463	0.4606	-0.9795	6.9221
W37	1.1936	1.1806	0.2703	-0.0738	0.4098	1.1827	0.3385	0.2626	11.4017
W38	1.4477	1.4938	0.3792	0.1516	0.4177	1.4819	0.4331	-0.4433	7.4816
W39	1.1869	1.1909	0.3067	0.0136	0.4608	1.1827	0.3663	-0.2692	7.4560
W40	0.9129	0.5638	0.8020	-0.5129	1.0680	0.7126	0.7864	-0.3802	3.9782
W41	0.7160	0.6950	0.4719	-0.0218	0.7258	0.7284	0.5630	0.9414	6.3832
W42	0.9847	1.0109	0.5350	0.1669	0.9470	1.0419	0.6515	0.9418	7.1869
W43	0.7533	0.7410	0.2674	-0.0949	0.5658	0.7757	0.4841	2.8929	20.8250
W44	0.3787	0.4246	0.7430	0.2452	1.2622	0.5221	0.7957	1.2604	5.0119
W45	0.3804	0.2915	0.7820	-0.0252	1.3139	0.4125	0.8874	1.2544	5.8048
W46	0.8115	0.8025	0.3241	-0.0088	0.6709	0.8274	0.4391	2.2874	16.7164
W47	0.0819	0.1204	0.5364	0.0664	1.4355	0.1291	0.6032	0.9193	5.7032
W48	1.2632	1.2278	0.4616	-0.1490	0.6373	1.2231	0.5209	-0.3687	5.3541
W49	0.7643	0.7427	0.6679	-0.0283	0.9918	0.7460	0.7161	0.2603	3.8745
W50	1.0521	1.0402	0.1981	-0.1000	0.3663	1.0455	0.2935	1.4328	18.4176
W51	1.1901	1.1868	0.3021	-0.0487	0.4898	1.1917	0.4261	0.8899	13.8917
W52	1.2097	1.2090	0.2842	-0.0065	0.4212	1.2091	0.3410	-0.1026	9.2859
W59	1.1178	1.1394	0.3103	0.1119	0.4805	1.1531	0.4106	1.1714	11.4415
W60	1.3899	1.4058	0.2804	0.0983	0.3661	1.4018	0.3805	-0.5874	17.1334
W101	1.0745	1.0336	0.4538	-0.1528	0.5875	1.0321	0.4894	-0.0797	4.7064
W102	1.4313	1.4022	0.3831	-0.1498	0.4602	1.3877	0.4538	-0.6843	7.1855
W104	0.7769	0.7432	0.6562	-0.0608	0.7393	0.7583	0.6415	0.1388	2.6032

TABLE 9. WESTMORELAND COUNTY
FORESHORE SLOPE INVENTORY

Station ID	Slope (degrees)
W1	21.5
W2	11.0
W3	9.5
W4	6.0
W5	8.5
W6	9.5
W7	7.0
W8	8.0
W9	8.0
W10	10.0
W11	6.0
W12	6.0
W13	5.0
W14	5.0
W20	7.0
W21	6.0
W22	10.0
W23	7.5
W24	6.5
W25	4.0
W26	6.5
W27	7.0
W28	11.0
W29	3.0
W30	7.5
W31	8.0
W32	7.0
W33	8.5
W34	10.0
W35	7.5
W36	6.0
W37	9.5
W38	10.5
W39	9.5
W40	7.5
W41	8.0
W42	9.5
W43	9.5
W44	10.0
W45	9.5
W46	9.0
W47	9.5
W48	6.5

WESTMORELAND COUNTY
FORESHORE SLOPE INVENTORY

Station ID	Slope (degrees)
W49	8.5
W50	6.5
W51	6.5
W52	6.5
W101	7.5
W102	6.0
W103	8.2
W104	6.5

Table 10a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
LANCASTER COUNTY
FORESHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
L1	18.0	81.5	0.5	0.0
L2	2.8	96.8	0.4	0.0
L3	4.2	95.4	0.4	0.0
L4	6.1	93.3	0.6	0.0
L5	0.9	98.6	0.5	0.0
L6	5.8	93.8	0.4	0.0
L7	1.9	97.6	0.5	0.0
L8	2.2	97.3	0.5	0.0
L9	10.7	89.0	0.3	0.0
L10	10.5	89.4	0.1	0.0
L11	1.0	98.4	0.6	0.0
L12	4.2	95.6	0.2	0.0
L13	0.0	99.7	0.3	0.0
L14	0.2	99.3	0.5	0.0
L15	13.0	86.4	0.6	0.0
L16	0.9	98.6	0.5	0.0
L17	0.0	99.5	0.5	0.0
L18	0.3	99.7	0.0	0.0
L19	1.3	98.2	0.5	0.0
L20	0.1	99.2	0.7	0.0
L21	0.0	99.6	0.4	0.0
L22	4.3	95.1	0.6	0.0
L23	2.0	97.7	0.3	0.0
L24	18.8	80.7	0.5	0.0
L25	12.0	87.5	0.5	0.0
L26	8.5	90.9	0.6	0.0
L27	43.1	55.8	1.1	0.0
L28	22.8	75.9	1.3	0.0
L29	3.3	94.8	1.9	0.0
L30	1.6	96.8	1.6	0.0

Table 10b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
LANCASTER COUNTY
FORESHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
L1	0.6063	0.5375	0.6267	-0.1537	0.9126	0.5482	0.6446	0.1710	3.6003
L2	0.3595	0.3617	0.4922	-0.0332	0.9229	0.3830	0.5660	0.8954	6.7553
L3	0.3053	0.3681	0.5618	0.1889	0.9031	0.4090	0.6090	0.9132	4.6828
L4	0.2428	0.2763	0.5767	0.0704	1.1714	0.3015	0.6398	1.2573	7.4641
L5	0.5837	0.5671	0.4522	-0.0682	0.8580	0.5746	0.4867	0.5056	5.7361
L6	0.1107	0.0832	0.5728	-0.0215	1.1852	0.1182	0.6025	0.7982	5.1259
L7	0.4477	0.4352	0.4377	-0.0056	0.9141	0.4899	0.5803	2.0699	11.5242
L8	0.6581	0.6322	0.3311	-0.1357	0.7036	0.6394	0.3905	1.1328	11.4603
L9	-0.0601	-0.0466	0.5203	0.1559	1.8150	0.0330	0.6812	2.5069	13.0513
L10	0.0415	-0.0020	0.4795	-0.0852	1.5587	0.0615	0.6176	1.9689	11.2481
L11	0.5762	0.5595	0.4274	-0.0727	0.7836	0.5686	0.5030	0.9421	9.2625
L12	0.0311	0.0323	0.5315	0.0927	1.5006	0.0944	0.6750	2.1360	10.6280
L13	0.7193	0.6971	0.3034	-0.0781	0.6996	0.7268	0.4279	2.0424	16.3847
L14	0.7182	0.6699	0.5052	-0.0629	0.8059	0.7069	0.5430	0.5105	4.5889
L15	0.7358	0.6310	0.8483	-0.1352	1.0633	0.6379	0.8786	0.0855	3.0303
L16	1.2831	1.2950	0.5467	0.0347	0.5902	1.2885	0.5875	-0.1935	4.7020
L17	1.3090	1.3033	0.4294	-0.0501	0.5360	1.2854	0.4709	-0.7872	6.3947
L18	0.8481	0.8320	0.3448	-0.1079	0.6182	0.8260	0.4251	0.1699	8.1669
L19	0.9623	0.9815	0.7069	-0.0121	0.8021	0.9512	0.7351	-0.0714	3.6395
L20	1.3714	1.3956	0.5259	0.0216	0.6168	1.3713	0.5496	-0.3802	4.5635
L21	0.9147	0.9318	0.5358	0.0877	0.7266	0.9471	0.5805	0.7600	5.4911
L22	0.8414	0.7675	0.6904	-0.1403	0.7718	0.7898	0.7097	0.3125	3.6459
L23	0.8648	0.7851	0.5686	-0.1616	0.6652	0.8158	0.6008	0.3186	4.3191
L24	0.4762	0.3916	0.5909	-0.1587	0.9540	0.4427	0.6424	0.8373	5.9245
L25	0.3137	0.2848	0.6006	-0.0474	0.9910	0.3035	0.6323	0.6504	4.9139
L26	0.3821	0.3154	0.6358	-0.0947	1.2941	0.3726	0.6733	0.5785	4.7405

Table 10b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
LANCASTER COUNTY
FORESHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
L27	-0.0618	0.2284	0.9162	0.5064	1.2769	0.3107	0.9897	1.2755	4.4423
L28	0.1475	0.2938	0.8472	0.2354	0.9295	0.2868	0.8249	0.5051	2.2920
L29	1.1688	0.8795	0.7780	-0.4954	0.8346	0.9462	0.8115	-0.3150	3.5330
L30	0.6277	0.6191	0.6451	-0.0311	1.0777	0.6107	0.6511	0.1789	3.4904

Table 11a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
LANCASTER COUNTY
BACKSHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
L1	8.9	90.8	0.3	0.0
L2	0.9	98.6	0.5	0.0
L3	0.1	99.2	0.7	0.0
L4	0.0	99.5	0.5	0.0
L5	0.0	99.5	0.5	0.0
L6	0.0	99.8	0.2	0.0
L7	0.0	99.7	0.3	0.0
L8	0.3	99.3	0.4	0.0
L9	2.1	97.6	0.3	0.0
L10	0.0	99.7	0.3	0.0
L11	0.0	99.8	0.2	0.0
L12	0.0	99.9	0.1	0.0
L13	0.0	99.7	0.3	0.0
L14	0.0	99.3	0.7	0.0
L15	0.1	99.5	0.4	0.0
L16	6.9	92.0	1.1	0.0
L17	0.0	99.4	0.6	0.0
L18	11.4	88.5	0.1	0.0
L19	0.0	97.2	2.8	0.0
L20	0.0	98.7	1.3	0.0
L21	0.0	99.8	0.2	0.0
L22	0.2	99.6	0.2	0.0
L23	0.0	99.8	0.2	0.0
L24	0.0	99.7	0.3	0.0
L25	4.2	95.5	0.3	0.0
L26	0.0	99.2	0.8	0.0
L27	0.0	98.2	1.8	0.0
L28	0.0	98.9	1.1	0.0
L29	0.0	98.5	1.5	0.0
L30	1.1	97.7	1.2	0.0

Table 11b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
LANCASTER COUNTY
BACKSHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
L1	1.1309	1.0881	0.4841	-0.1915	0.7077	1.0697	0.5470	-0.5605	5.4967
L2	1.0419	1.0897	0.5327	0.1195	0.7522	1.0965	0.6297	0.5406	6.2936
L3	0.9161	0.9212	0.4910	0.0665	0.6876	0.9474	0.5301	0.7835	5.8942
L4	1.1177	1.1334	0.3779	0.0911	0.5368	1.1528	0.4781	0.8470	8.9261
L5	0.9465	0.9342	0.4336	-0.0724	0.6498	0.9515	0.5203	1.0034	9.2268
L6	0.7166	0.7346	0.4407	0.1139	0.7484	0.7581	0.4893	0.7451	5.6697
L7	0.7981	0.7695	0.3400	-0.1258	0.6156	0.7758	0.4359	1.3760	15.6959
L8	0.9163	0.9185	0.3365	-0.0394	0.6019	0.9405	0.4854	2.1944	14.1352
L9	0.9943	0.9529	0.4444	-0.1792	0.6888	0.9580	0.5269	0.6387	8.0728
L10	1.1945	1.2067	0.3299	-0.0098	0.5170	1.2031	0.4071	0.4105	8.2218
L11	1.2917	1.2863	0.2324	-0.0291	0.3590	1.3079	0.4289	1.3501	18.7101
L12	0.9288	0.9033	0.3478	-0.1492	0.6092	0.9015	0.4215	-0.1678	8.1517
L13	1.1653	1.1653	0.3270	-0.0157	0.4827	1.1596	0.3846	-0.2275	8.8059
L14	0.9867	1.0184	0.6216	0.0645	0.8235	1.0149	0.6331	0.1845	3.6684
L15	1.5919	1.5986	0.3997	0.0160	0.4513	1.6051	0.4925	0.4645	6.6641
L16	1.2673	1.2782	0.9459	-0.0360	0.6198	1.2706	0.9443	-0.1318	2.2269
L17	1.5378	1.5333	0.4255	-0.0551	0.4528	1.5215	0.4830	-0.7277	7.5365
L18	0.7997	0.7149	0.5260	-0.3242	0.9330	0.6997	0.5651	-0.5628	4.5888
L19	1.9664	1.8264	0.6739	-0.3396	0.5544	1.8094	0.6984	-0.8632	3.7219
L20	1.4956	1.5294	0.3993	0.1289	0.4490	1.5295	0.4674	-0.0275	9.0580
L21	1.5805	1.5814	0.2800	0.0007	0.3510	1.5812	0.3809	-0.0105	14.5239
L22	1.4014	1.3788	0.3263	-0.1296	0.4524	1.3804	0.4652	0.2481	12.2284
L23	1.2897	1.2868	0.3336	-0.0303	0.4187	1.2942	0.3967	0.8021	8.5445
L24	1.1686	1.1788	0.4272	0.0871	0.6303	1.2060	0.5159	1.1486	8.3017
L25	0.5912	0.5588	0.5127	-0.1046	0.9384	0.5553	0.5430	-0.1277	4.1520
L26	1.2327	1.2584	0.3993	0.1230	0.4885	1.2708	0.4566	0.6463	7.4611

Table 11b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
LANCASTER COUNTY
BACKSHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
L27	1.5111	1.5178	0.2894	0.0036	0.3519	1.5105	0.3457	-0.2752	8.9087
L28	1.5061	1.4669	0.3774	-0.1654	0.4185	1.4612	0.4299	-0.4299	6.4050
L29	1.0428	1.0329	0.4452	-0.0888	0.6106	1.0338	0.5276	0.0721	7.3261
L30	0.7540	0.7103	0.7646	-0.0507	0.6824	0.7139	0.7609	0.1068	2.0798

TABLE 12. LANCASTER COUNTY
FORESHORE SLOPE INVENTORY

Station ID	Slope (degrees)
L1	6.5
L2	6.5
L3	9.0
L4	9.5
L5	10.0
L6	7.0
L7	6.0
L8	5.0
L9	5.5
L10	5.5
L11	10.0
L12	10.0
L13	10.0
L14	6.0
L15	10.5
L16	8.5
L17	6.0
L18	6.0
L19	6.5
L20	7.0
L21	8.5
L22	10.0
L23	5.5
L24	8.5
L25	9.5
L26	11.0
L27	11.5
L28	8.5
L29	9.0
L30	7.0

Table 13a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
RICHMOND COUNTY
FORESHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
R1	1.0	96.9	2.1	0.0
R2	12.0	86.7	1.3	0.0
R3	10.7	87.6	1.7	0.0
R4	7.1	91.7	1.2	0.0
R5	0.5	97.4	2.1	0.0
R6	1.1	96.7	2.2	0.0
R7	71.3	27.1	1.6	0.0
R8	2.1	96.3	1.6	0.0
R9	13.8	70.9	15.3	0.0
R10	33.5	64.7	1.8	0.0

Tables 13b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
RICHMOND COUNTY
FORESHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
R1	1.1937	1.1118	0.5656	-0.2285	0.6404	1.1015	0.5847	-0.3899	3.6972
R2	0.2197	0.2937	0.6901	0.1525	1.1561	0.3040	0.7124	0.9215	4.8681
R3	0.5103	0.4400	0.8436	-0.0944	0.8244	0.4622	0.8291	0.0522	2.2828
R4	0.6102	0.6302	0.7114	0.0608	0.8096	0.6331	0.7322	0.2947	3.0351
R5	1.0264	0.9727	0.5507	-0.1441	0.6227	0.9790	0.5910	0.0507	4.9251
R6	1.3183	1.2583	0.4028	-0.2555	0.4951	1.2450	0.4654	-0.9582	7.2409
R7	0.1606	0.3489	0.9850	0.2555	0.8803	0.4096	1.0285	0.6928	3.0316
R8	1.0494	1.0608	0.5423	-0.0095	0.6829	1.0467	0.5442	-0.2390	3.3642
R9	1.8220	1.8496	1.0538	-0.0569	0.6506	1.7988	1.0048	-0.3062	2.4993
R10	1.0087	0.8560	0.9121	-0.1958	0.7226	0.8662	0.9251	0.0135	2.2895

Table 14a. SEDIMENT SURVEY DATA
GRAIN SIZE PERCENTAGES
RICHMOND COUNTY
BACKSHORE

STATION	GRAVEL%	SAND%	SILT%	CLAY%
R1	2.3	96.3	1.4	0.0
R2	0.1	97.2	2.7	0.0
R3	9.5	88.9	1.6	0.0
R4	0.0	98.2	1.8	0.0
R5	0.0	97.5	2.5	0.0
R7	27.3	70.2	2.5	0.0
R8	0.0	97.7	2.3	0.0
R9	4.2	90.7	5.1	0.0
R10	16.3	82.0	1.7	0.0

Table 14b. SEDIMENT SURVEY DATA
GRAIN SIZE STATISTICS
RICHMOND COUNTY
BACKSHORE

STATION	G_MEDIAN	G_MEAN	G_STDEV	G_SKEWN	G_KURTO	M_MEAN	M_STDEV	M_SKEW	M_KURT
R1	0.5673	0.5827	0.7318	0.0259	0.8047	0.5893	0.7394	0.2779	2.8913
R2	1.1960	1.1418	0.4410	-0.2932	0.6463	1.1194	0.5007	-0.4588	6.8571
R3	0.4694	0.4852	0.6664	0.0270	0.9984	0.4983	0.7437	0.9879	5.6149
R4	1.5206	1.5034	0.3286	-0.1686	0.4213	1.4747	0.3801	-1.0774	6.4217
R5	1.2862	1.2488	0.4159	-0.1267	0.4759	1.2561	0.4764	0.2513	7.0692
R7	0.9289	0.7378	0.8932	-0.2618	0.7614	0.7882	0.9010	-0.0141	2.5827
R8	1.5321	1.5198	0.3381	-0.0714	0.3936	1.5100	0.3945	-1.0048	8.6754
R9	1.3614	1.2405	0.6410	-0.3751	0.7612	1.2305	0.7239	-0.4698	5.2671
R10	1.2059	0.9641	0.7864	-0.4089	0.7522	1.0173	0.8495	0.0007	3.7944

TABLE 15. RICHMOND COUNTY
FORESHORE SLOPE INVENTORY

Station ID	Slope (degrees)
R1	12.5
R2	9.5
R3	9.5
R4	5.5
R5	6.5
R6	11.0
R7	8.3
R8	10.0
R9	4.5
R10	8.0
R11	9.0
R12	14.0
R13	19.0
R14	14.0
R15	15.0
R16	14.0
R17	13.0
R18	15.0
R19	5.0
R20	11.0
R21	15.0
R22	15.0
R23	16.0
R24	12.0
R25	15.0
R26	21.0
R27	15.0
R28	14.0
R29	18.0
R30	18.0
R31	15.0
R32	15.0
R33	10.0
R34	15.0

TABLE 16. NORTHUMBERLAND COUNTY
FORESHORE SLOPE INVENTORY

Station ID	Slope (degrees)
N1	15.0
N2	14.0
N3	11.0
N4	13.0
N5	5.0
N6	13.0
N7	10.0
N8	10.0
N9	5.0
N10	17.0
N11	12.0
N12	12.0
N13	15.0
N14	16.0
N15	15.0
N16	11.0
N17	19.0
N18	15.0
N19	20.0
N20	14.0
N21	10.0
N22	14.0
N23	10.0

CHAPTER XI. TIDAL MARSH INVENTORY COVERAGE

XI. TIDAL MARSH INVENTORY COVERAGE

The Tidal Marsh Inventory Coverage (TMI) is the digital record of the VIMS Tidal Marsh Inventories developed by the Wetlands Research Program at the Virginia Institute of Marine Science (VIMS). The original delineation of tidal marshes were obtained using aerial photographs, topographic maps, and ground-truthing methods. The tidal marsh boundaries, forming polygons, were digitized at a scale of 1:24,000 and coded by location (FIPS). The marsh polygons are then transposed onto the SHL, 1:24,000 shoreline coverage (ref. Chapter 2). Future updates to the GIS Inventory will code marshes (e.g. polygons) by an existing set of criteria which will identify marsh polygons on the basis of species and habitat. Following is a complete folio of existing TMI coverages, represented at a scale of 1:68,000, and documentation pertaining to these coverages.

GEOGRAPHIC DATA SET DESCRIPTION

VIMS GIS Lab Prefix TMI

Data Layer Name VIMS Tidal Marsh Inventory (VIMS Wetlands Inventory)

Description Inventory of tidal wetlands in Virginia, by Wetlands Dept. of the Virginia Institute of Marine Science, as mandated by Sec. 62.1-13.4 of the Virginia Wetlands Act of 1972 (Code of Va., Title 62.1).

Year(s) Collected Various, 1974 - present

Base Maps used for Digitizing MYLAR USGS TOPO MAPS

Digitizing Scale 1:24000 Map Projection UTM Zone 18

Geographic Extent Inventories complete for most of Va. coastal counties, selected portions of the coastal zone have been digitized.

How Collected (Describe):

Tidal marsh data was collected by groundtruthing the tidal waters of Virginia. Inventory reports were then published and wetland polygons were transfered to mylar topos for digitizing.

Actual/Intended Use or Purpose:

The TMI coverages were generated with the intended purpose of creating RPA and RMA planning maps, for evaluating salinity induced changes in the upper Pamunky River, and monitoring changes to wetland resources.

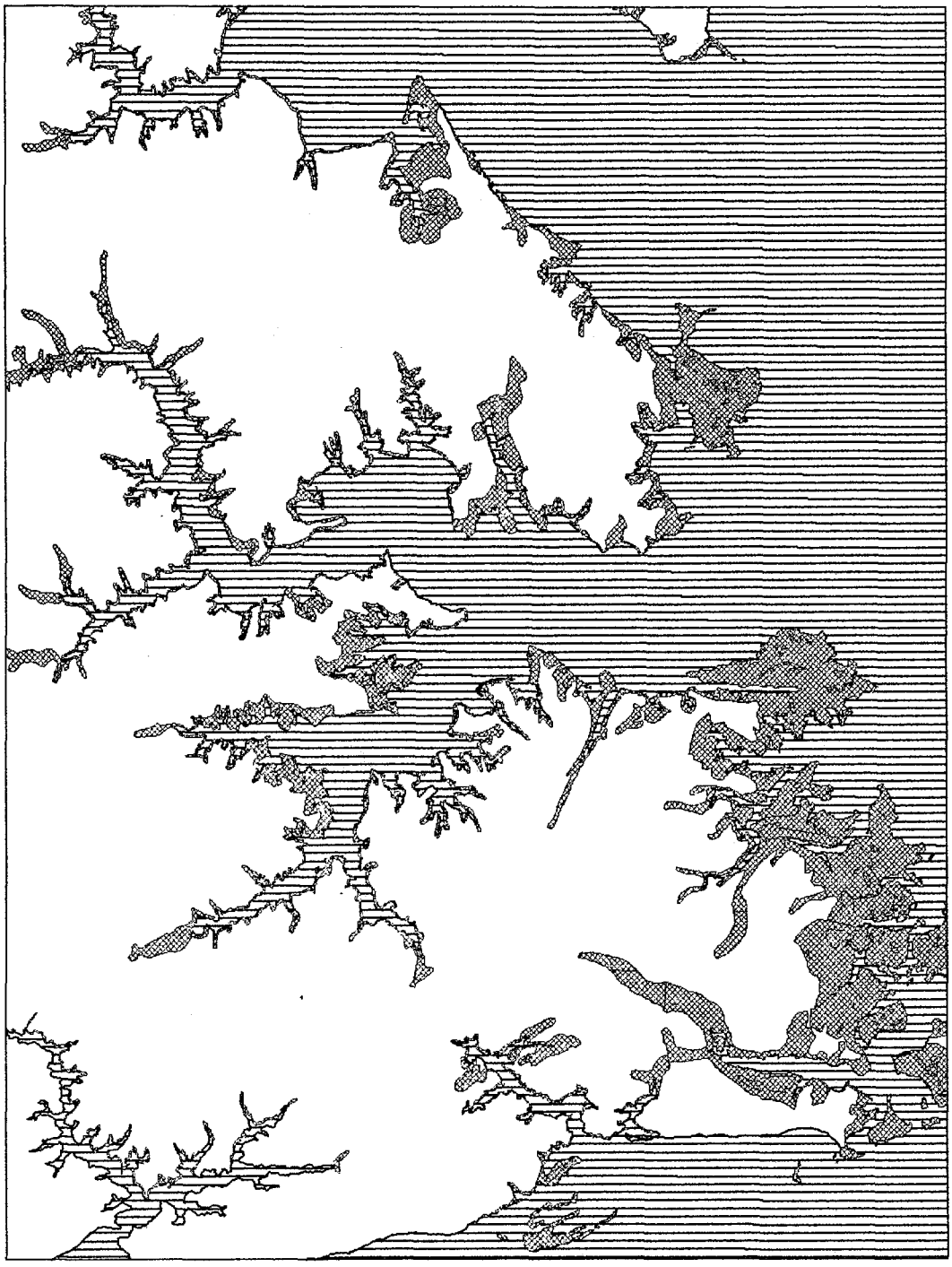
VA TIDAL RIVERS INVENTORY

AVERAGE TIME AND DISC SPACE USED*

TIDAL MARSH INVENTORY

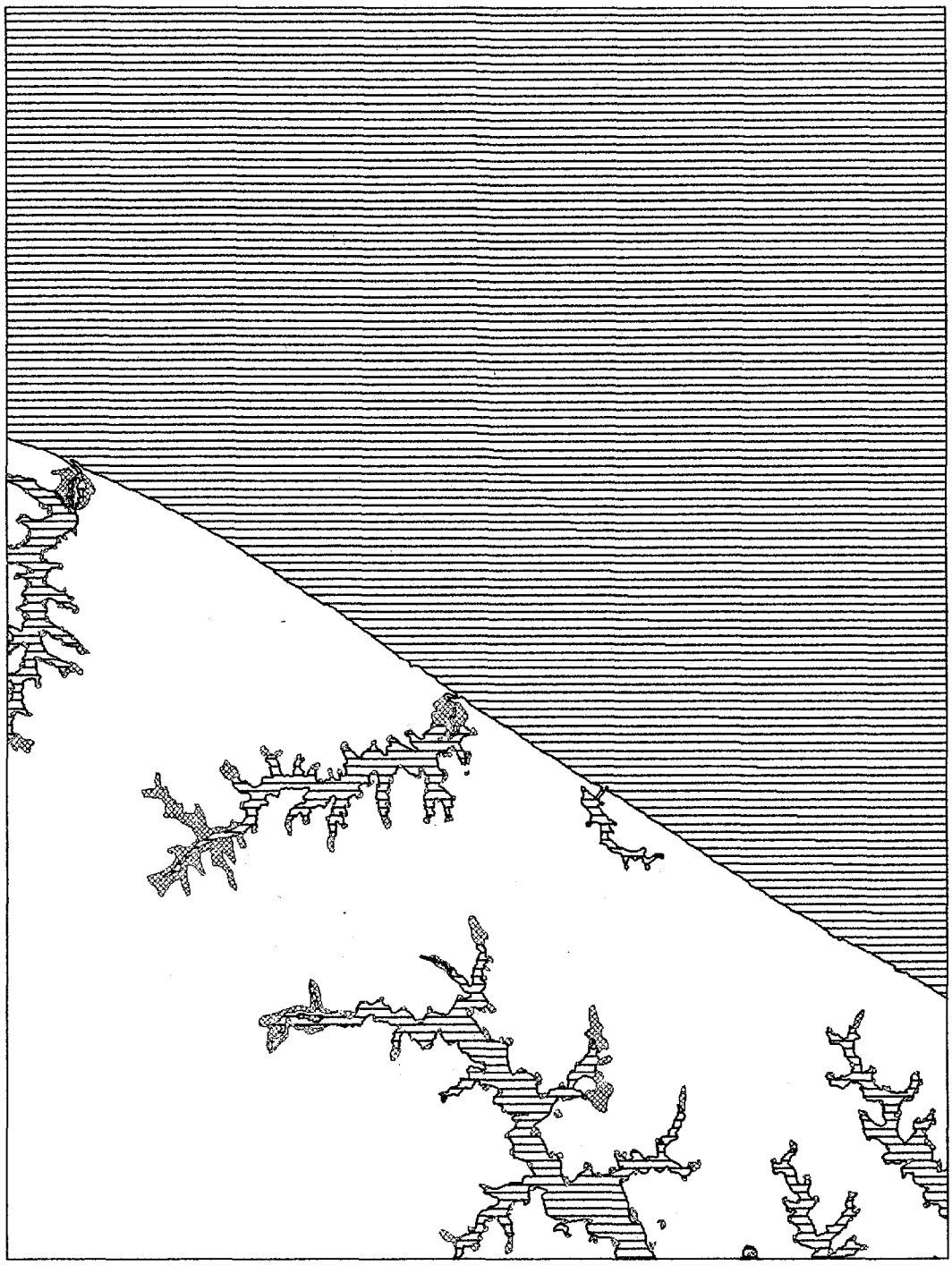
MAP NUMBER	TIME	DISC SPACE
TMI5307	18.0	296960
TMI5407	18.0	342016
TMI5413	5.25	178176
TMI5414	21.0	251904
TMI5415	21.0	382976
TMI5506	5.5	90112
TMI5507	24.0	497664
TMI5512	13.0	264192
TMI5513	25.0	391168
TMI5514	13.0	227320
TMI5515	2.0	73728
TMI5607	19.0	415744
TMI5611	8.0	124928
TMI5612	35.0	526336
TMI5613	10.0	116736
TMI5711	33.0	444416
TMI5712	15.0	184320
TMI5713	19.0	423936
TMI5714	11.0	240468
TMI5807	17.25	446464
TMI5808	5.0	81920
TMI5809	15.0	307200
TMI5810	20.0	622592
TMI5811	16.0	229376
TMI5812	7.5	178176
TMI5813	19.0	356352
TMI5814	1.25	69632
TMI5907	55.0	999424
TMI5909	26.5	569344
TMI5910	14.0	315392
TMI5911	13.0	196608
TMI5912	17.5	587776
TMI5913	2.5	88064
TMI6007	17.25	307200
TMI6010	17.0	491520
TMI6011	36.0	697568
TMI6012	23.5	512000
AVERAGE	17.25	338641

*TIME IN HOURS, DISC SPACE IN BYTES



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
ACHILLES
GLOUCESTER COUNTY

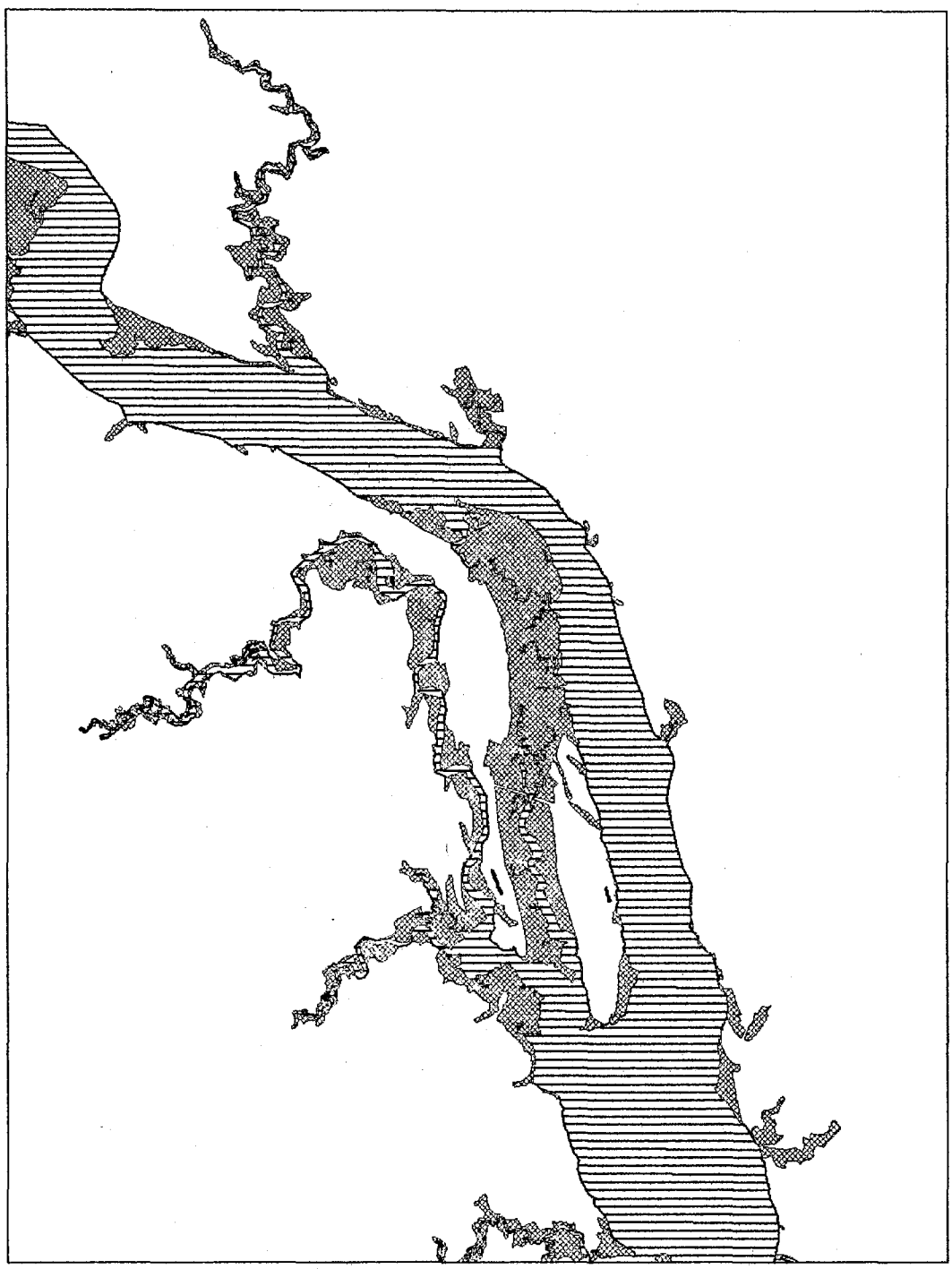
TMI5907
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
BURGESS
NORTHUMBERLAND CO

TMI6012

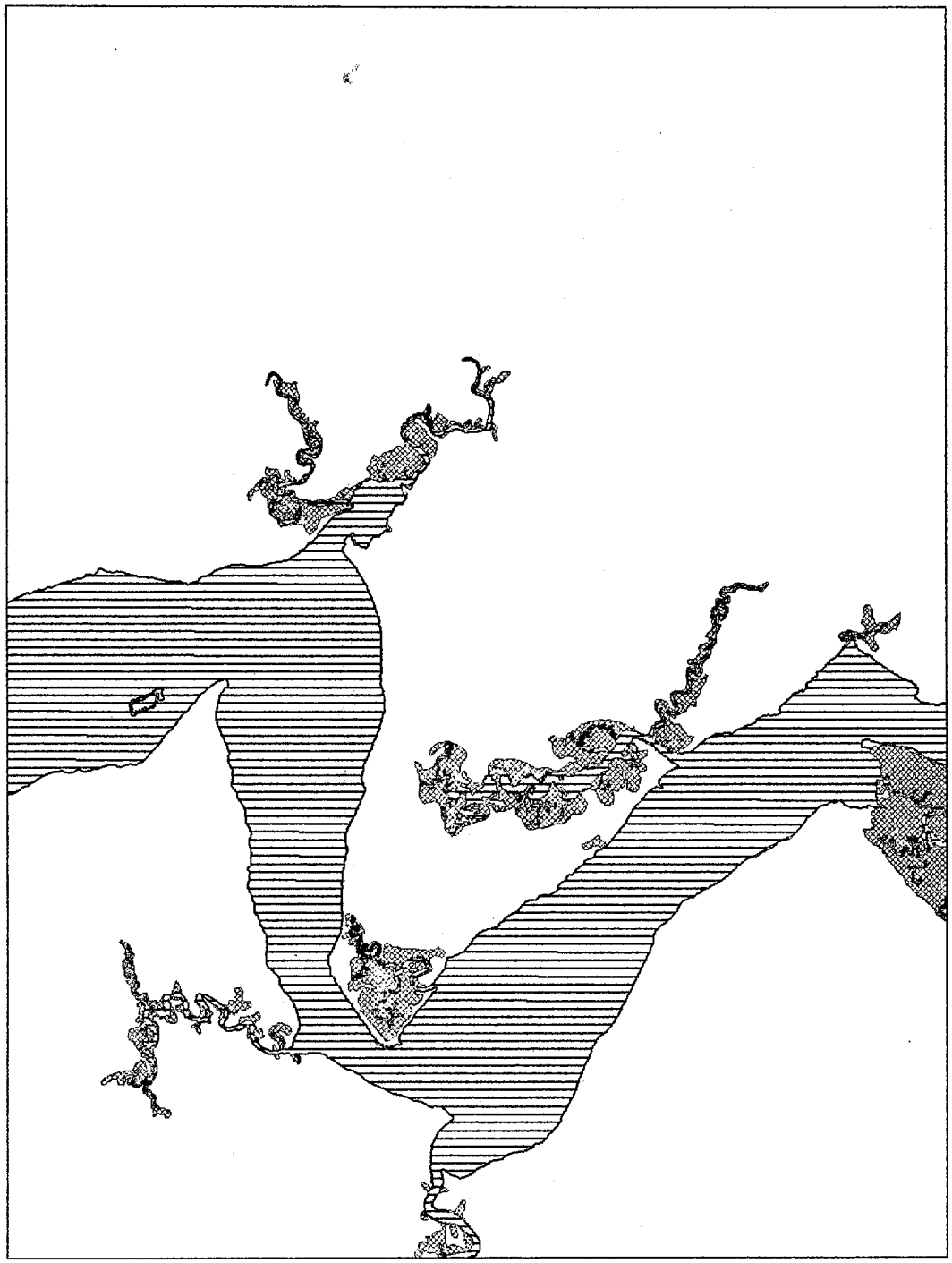
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
CHAMPLAIN
WESTMORELAND CO

TMI5513

WETLANDS
WATER

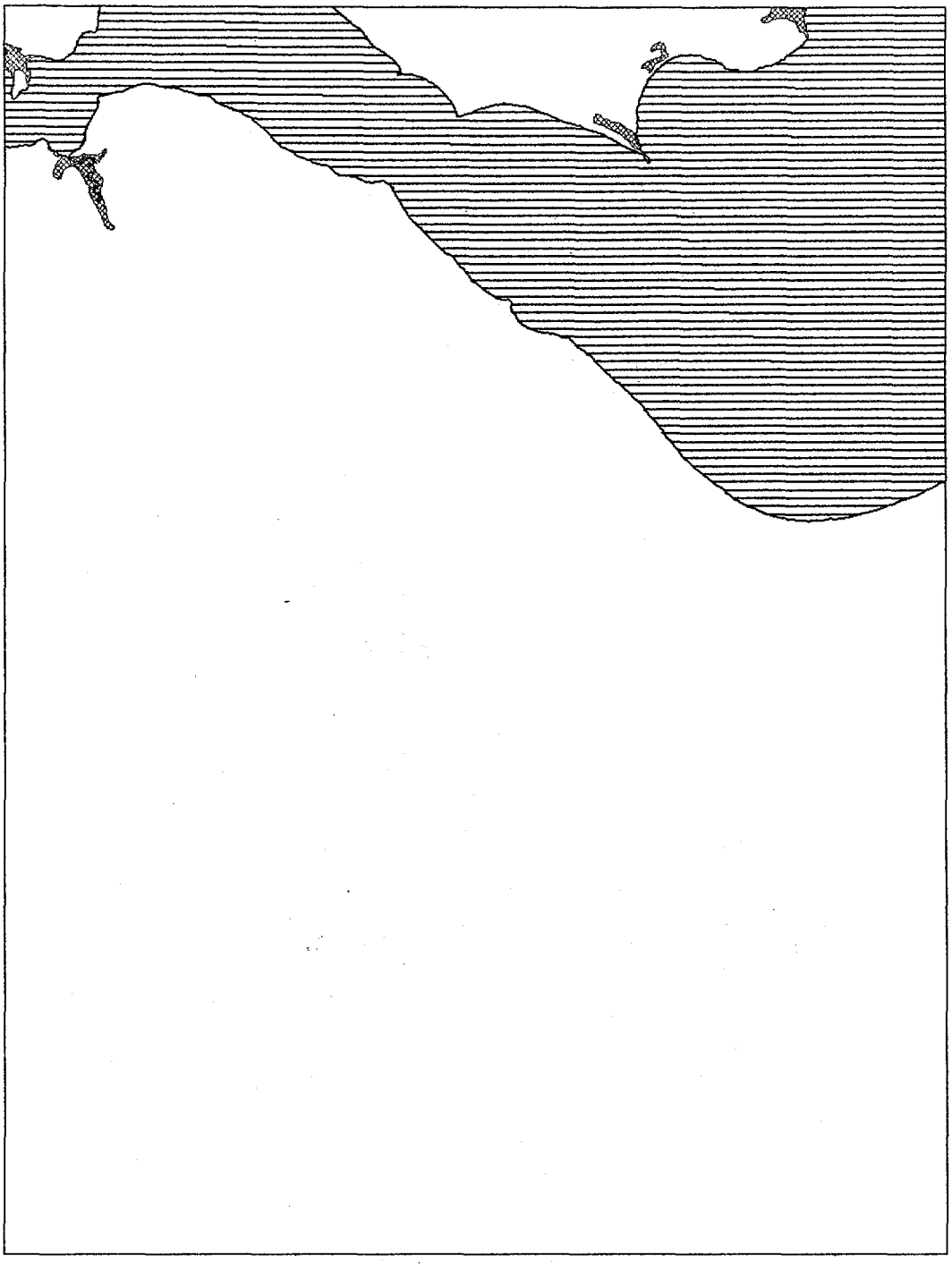


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
CHARLES CITY
CHARLES CITY COUNTY

TMI5407

WETLANDS

WATER

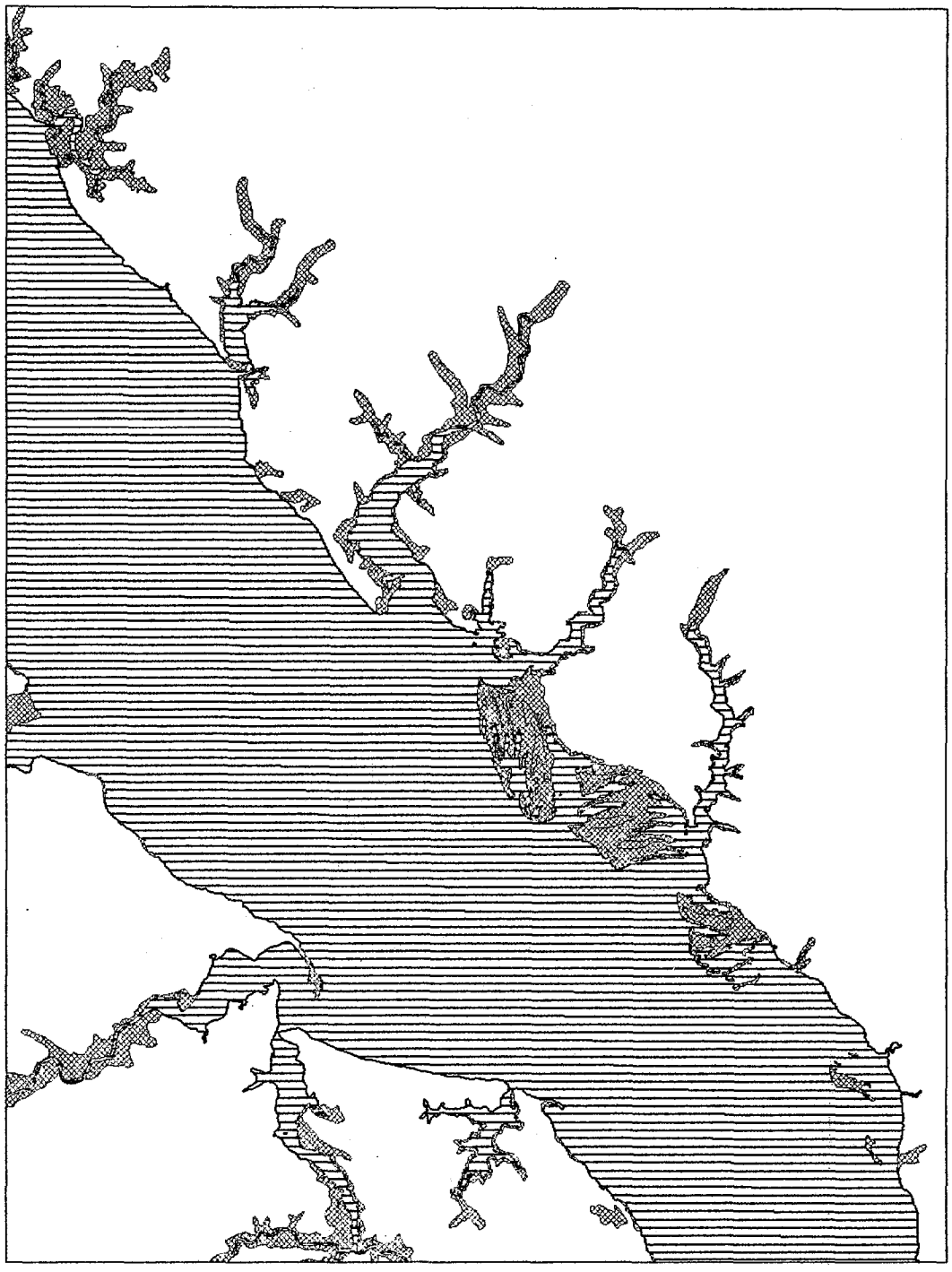


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
CLAREMONT
PRINCE GEORGE COUNTY

TMI5506

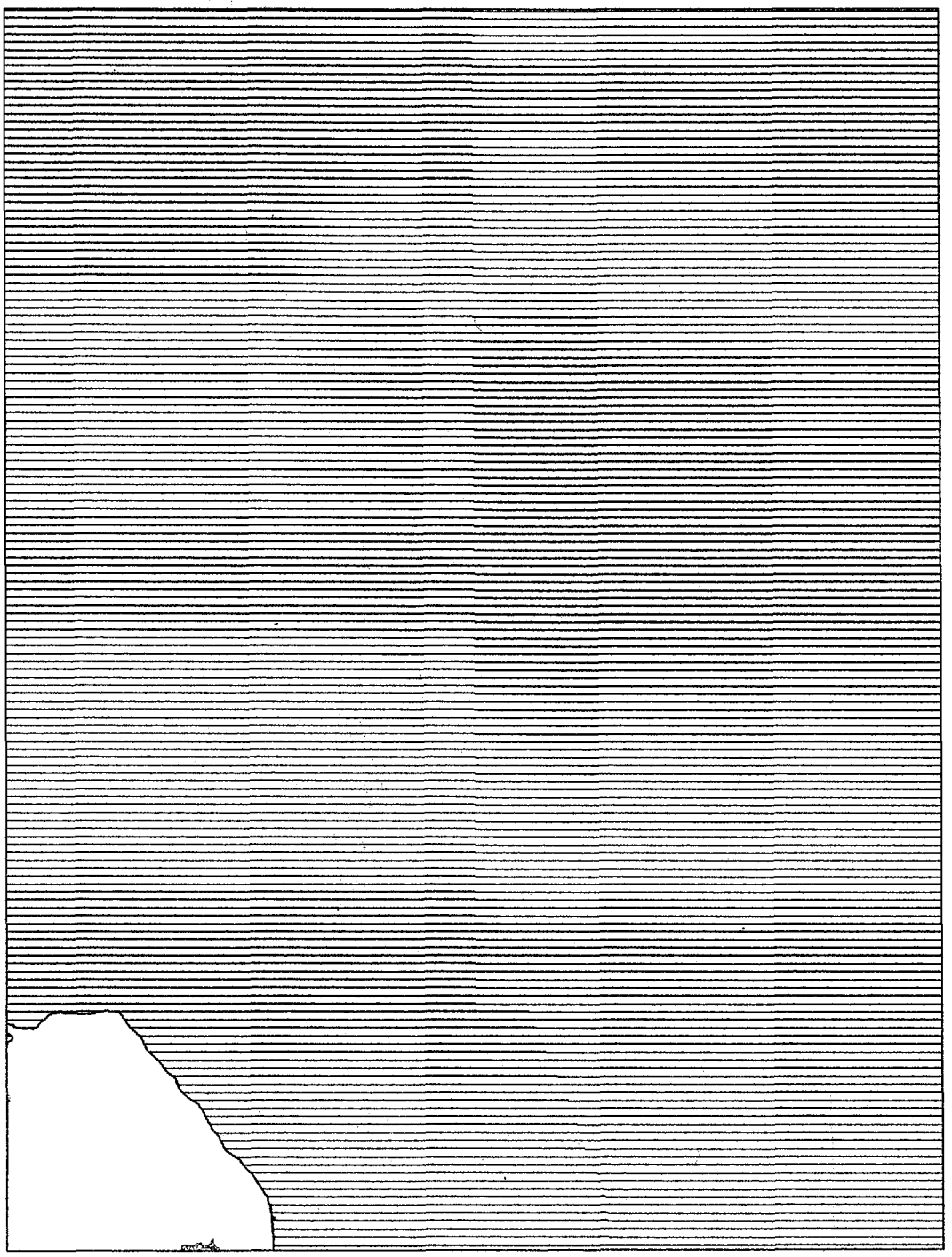
WETLANDS

WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
CLAY BANK
GLOUCESTER COUNTY

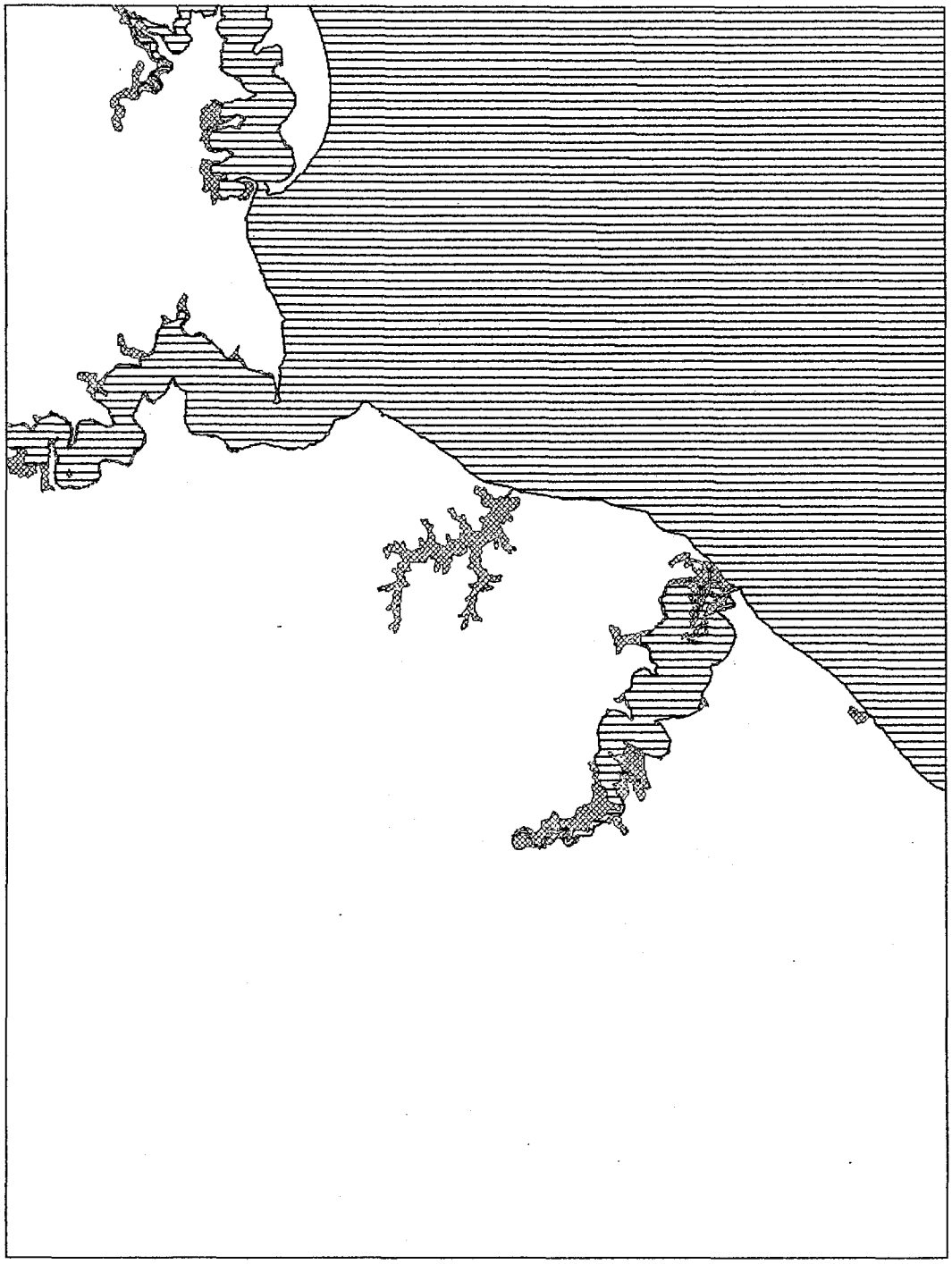
TMI5807
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
COLONIAL BEACH NORTH
WESTMORELAND CO

TMI5515

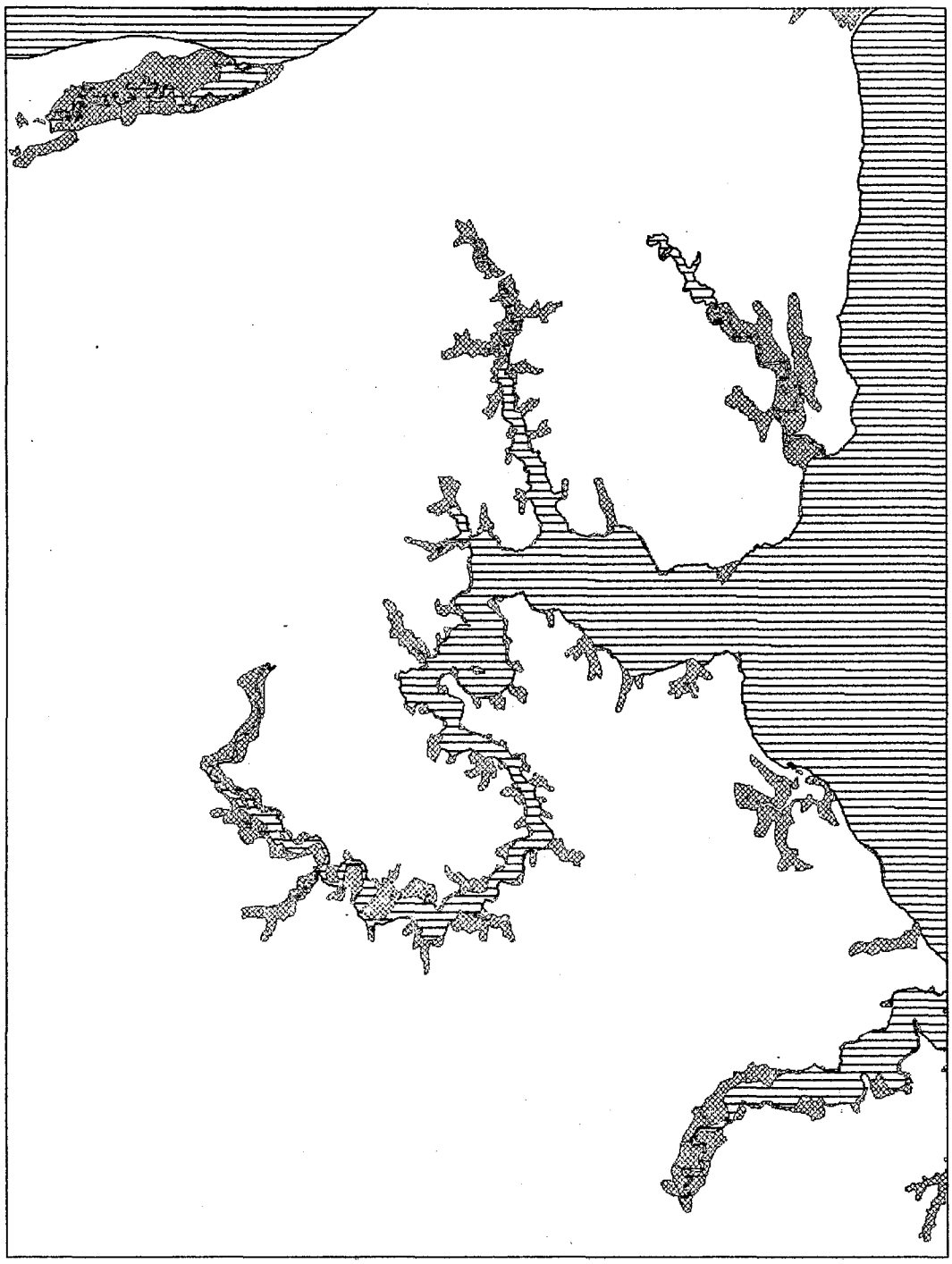
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
COLONIAL BEACH SOUTH
WESTMORELAND CO

TMI5514

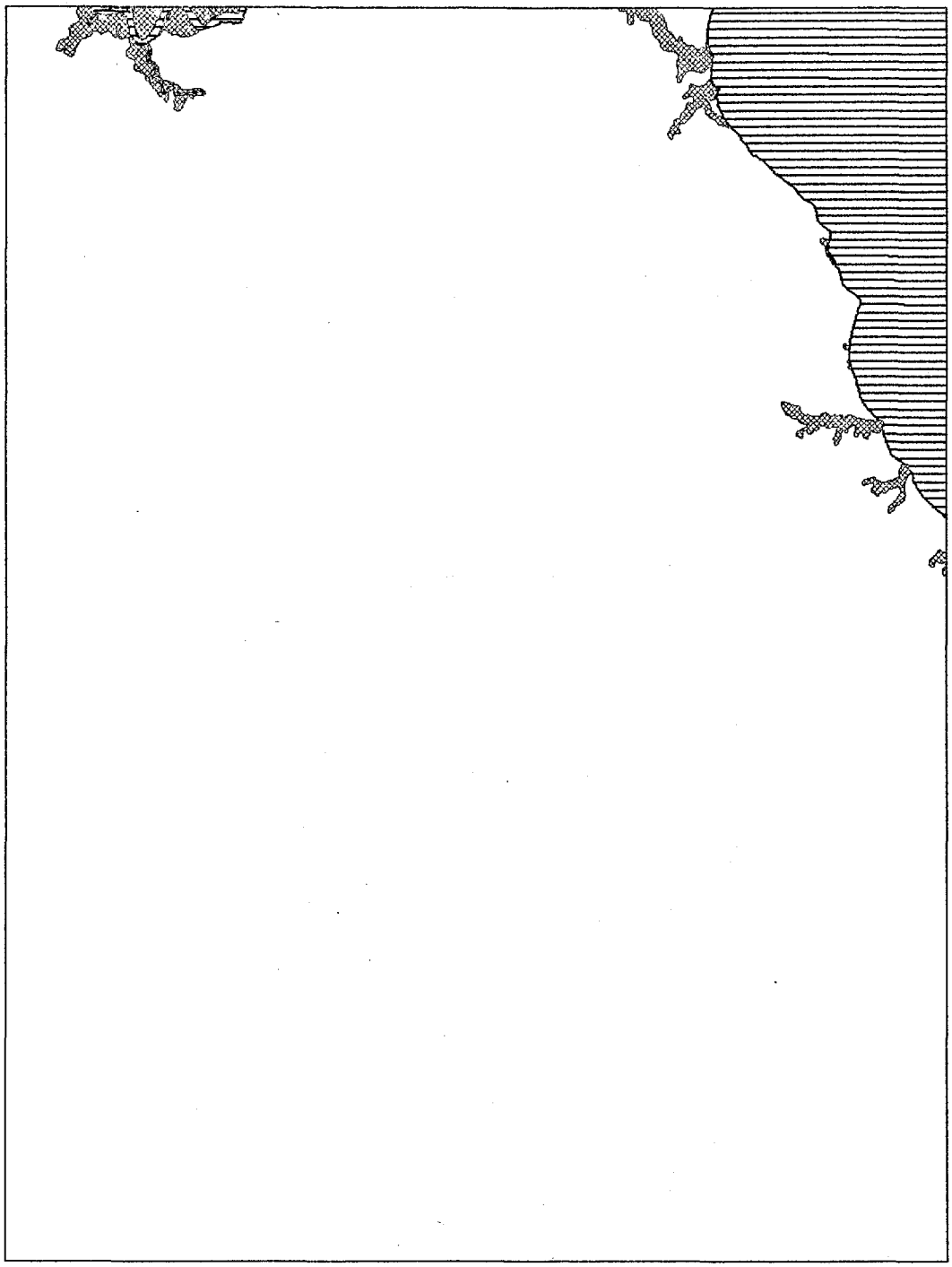
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
DAHLGREN
WESTMORELAND CO

TMI5415

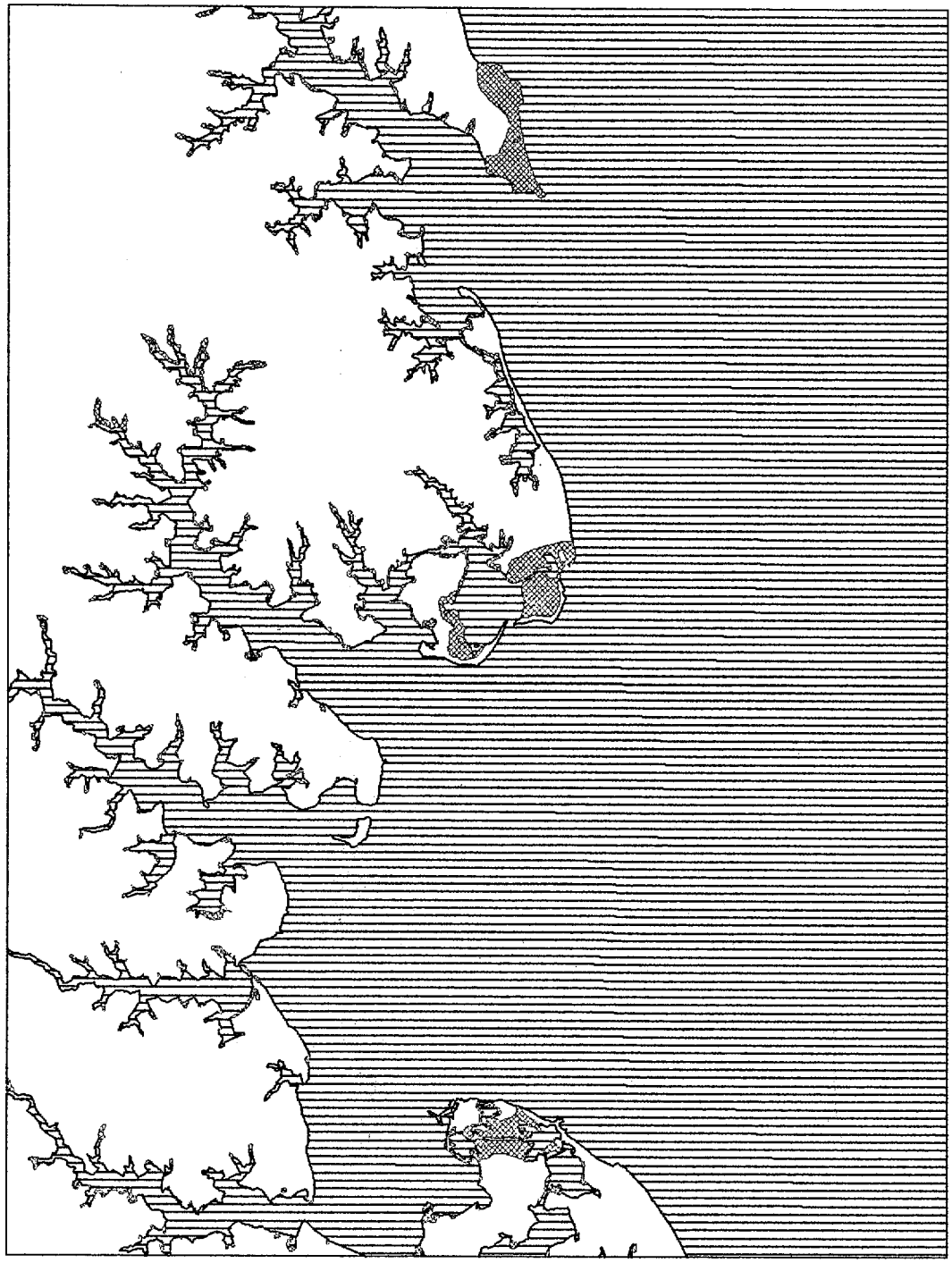
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
DUNNSVILLE
ESSEX CO

TMI5611

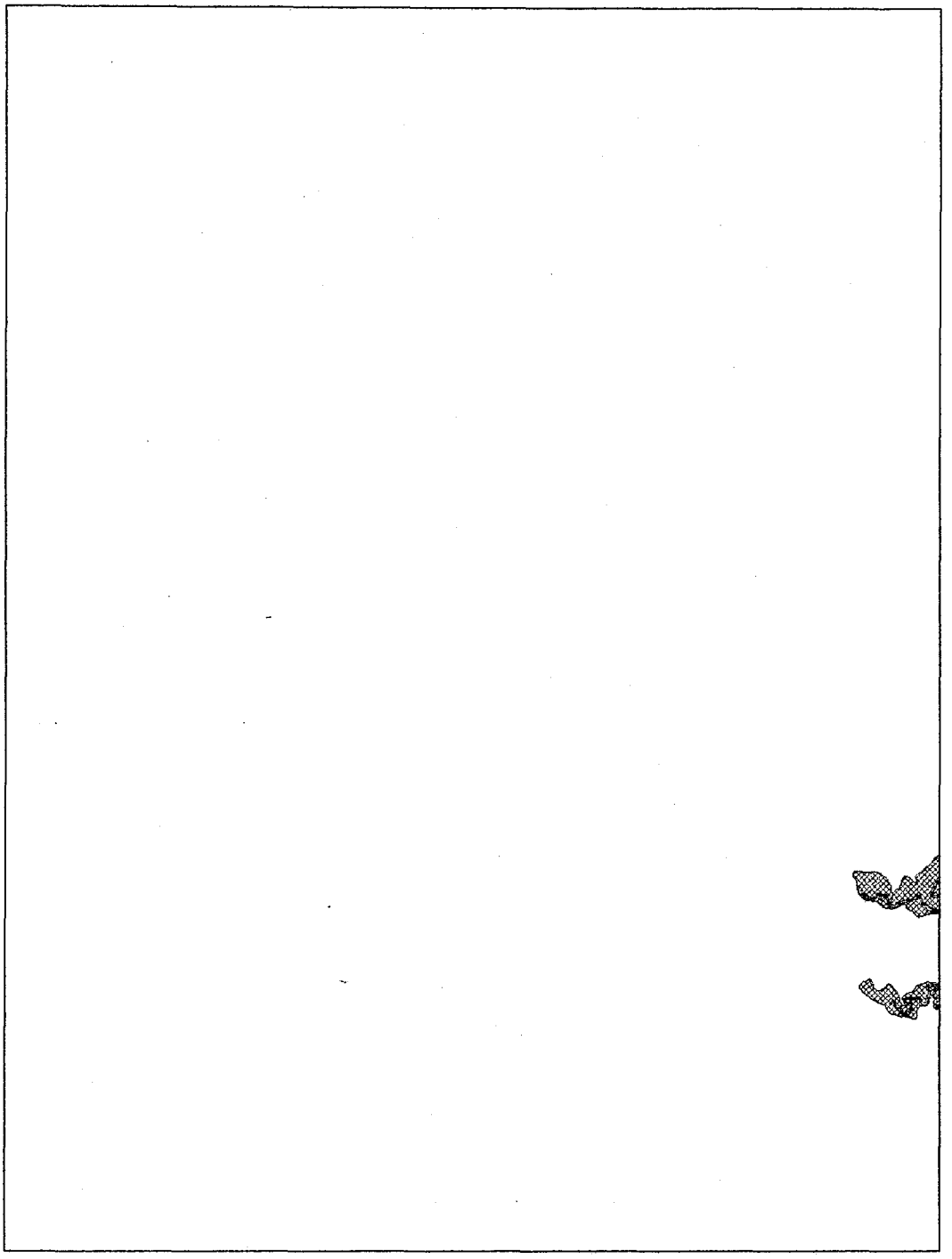
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
FLEETS BAY
LANCASTER CO

TMI6010

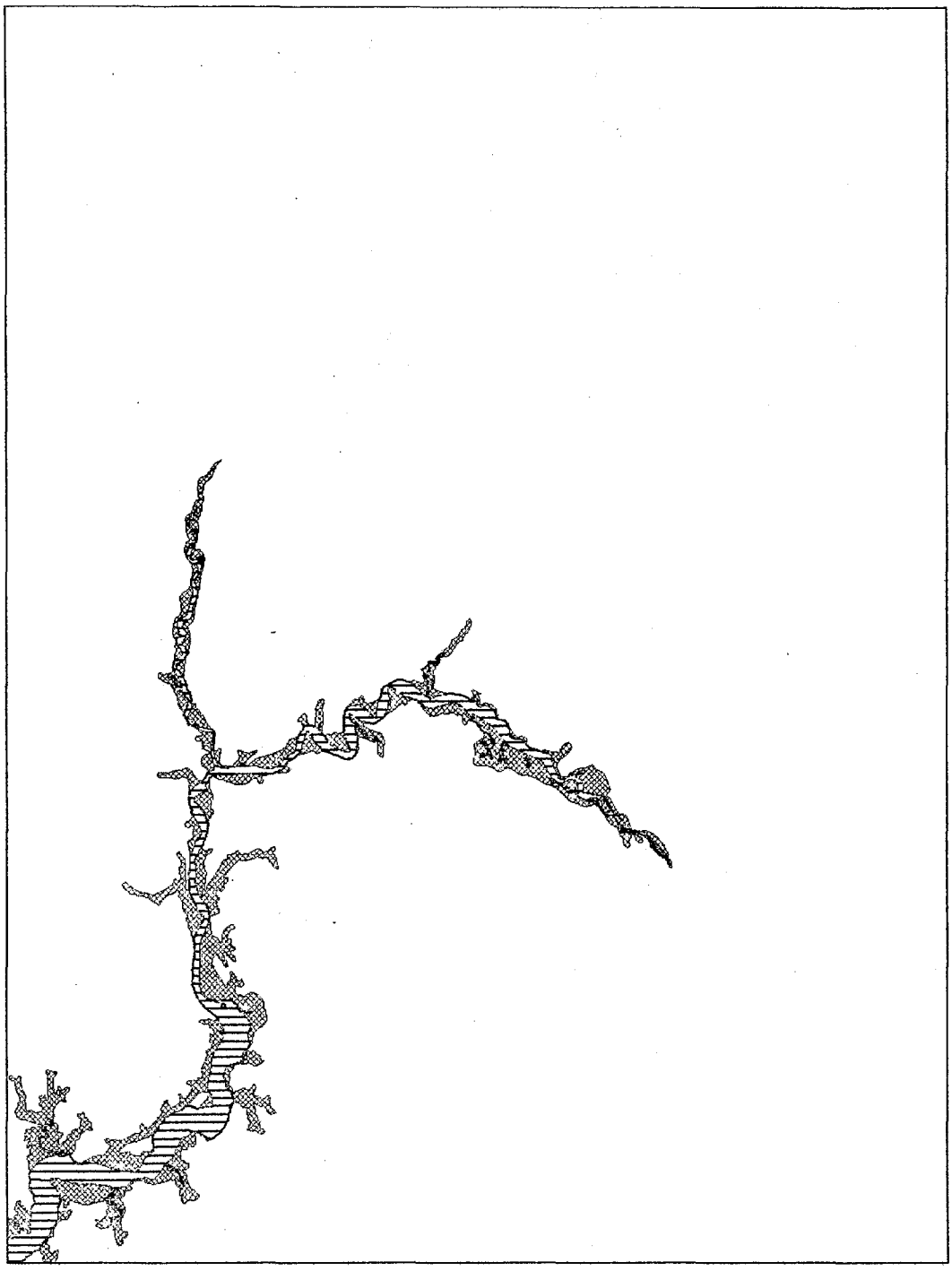
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
GLOUCESTER
GLOUCESTER CO

TM15808

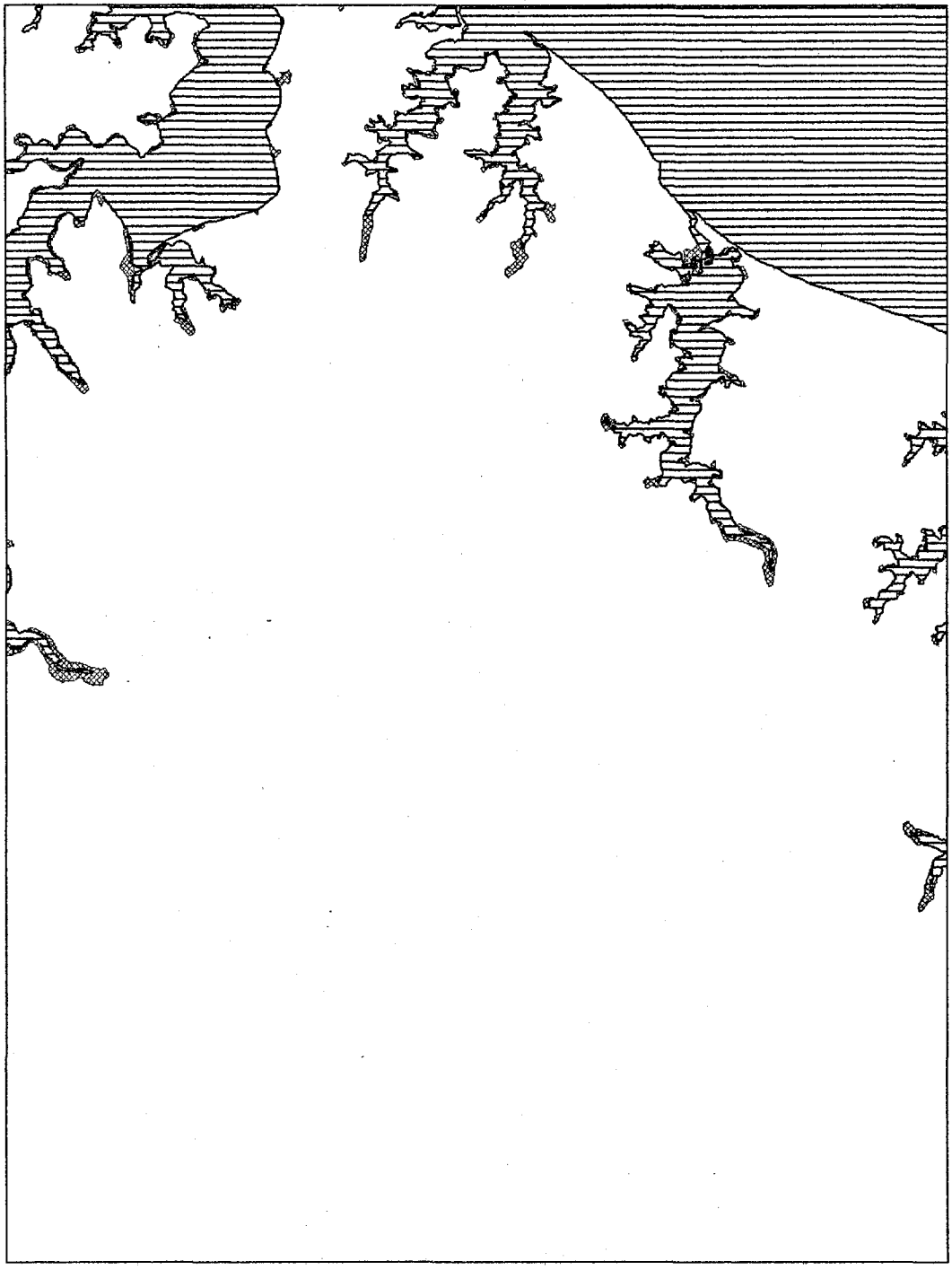
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
HAYNESVILLE
RICHMOND CO

TMI5712

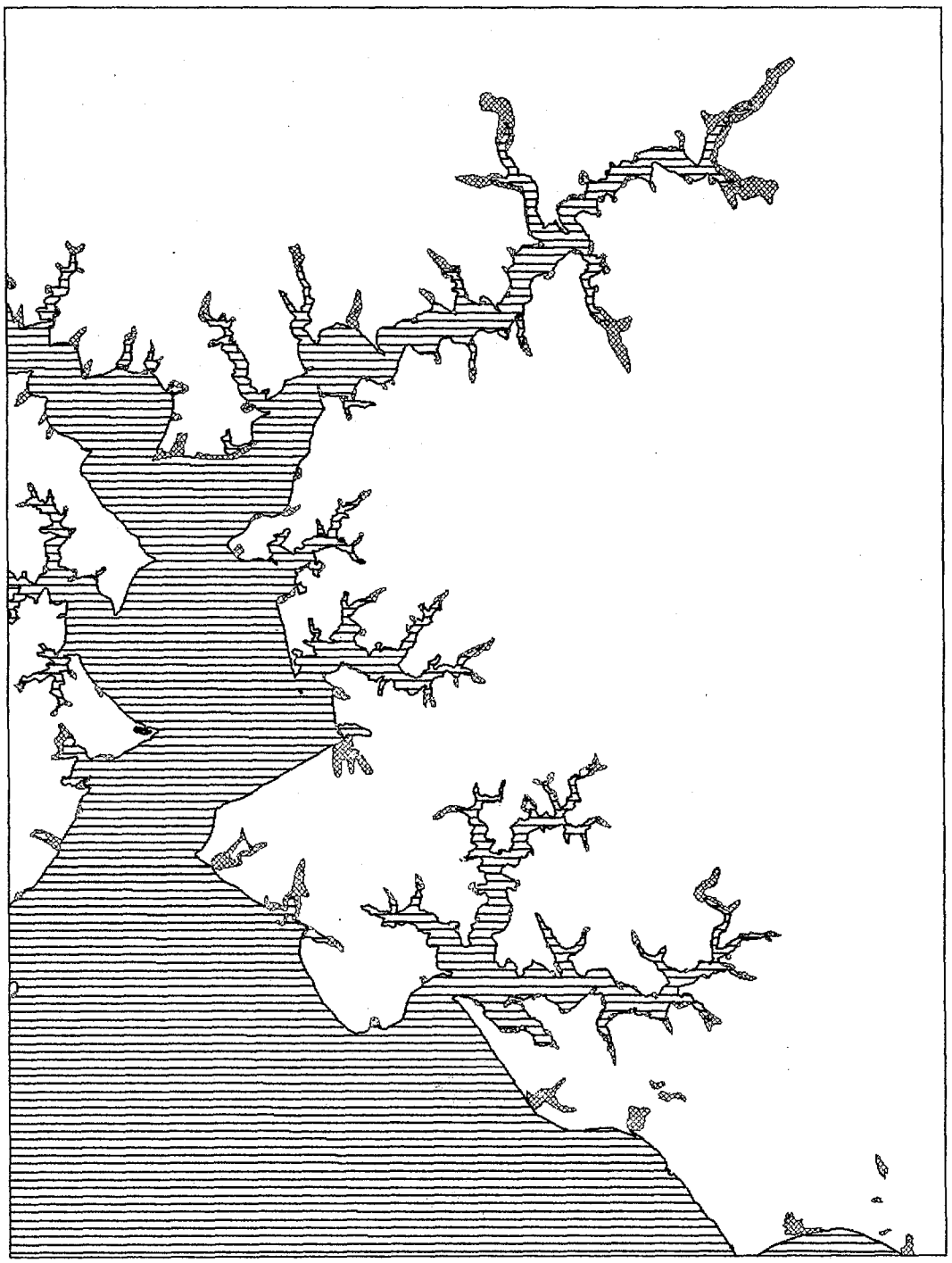
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
HEATHSVILLE
NORTHUMBERLAND CO

TMI5912

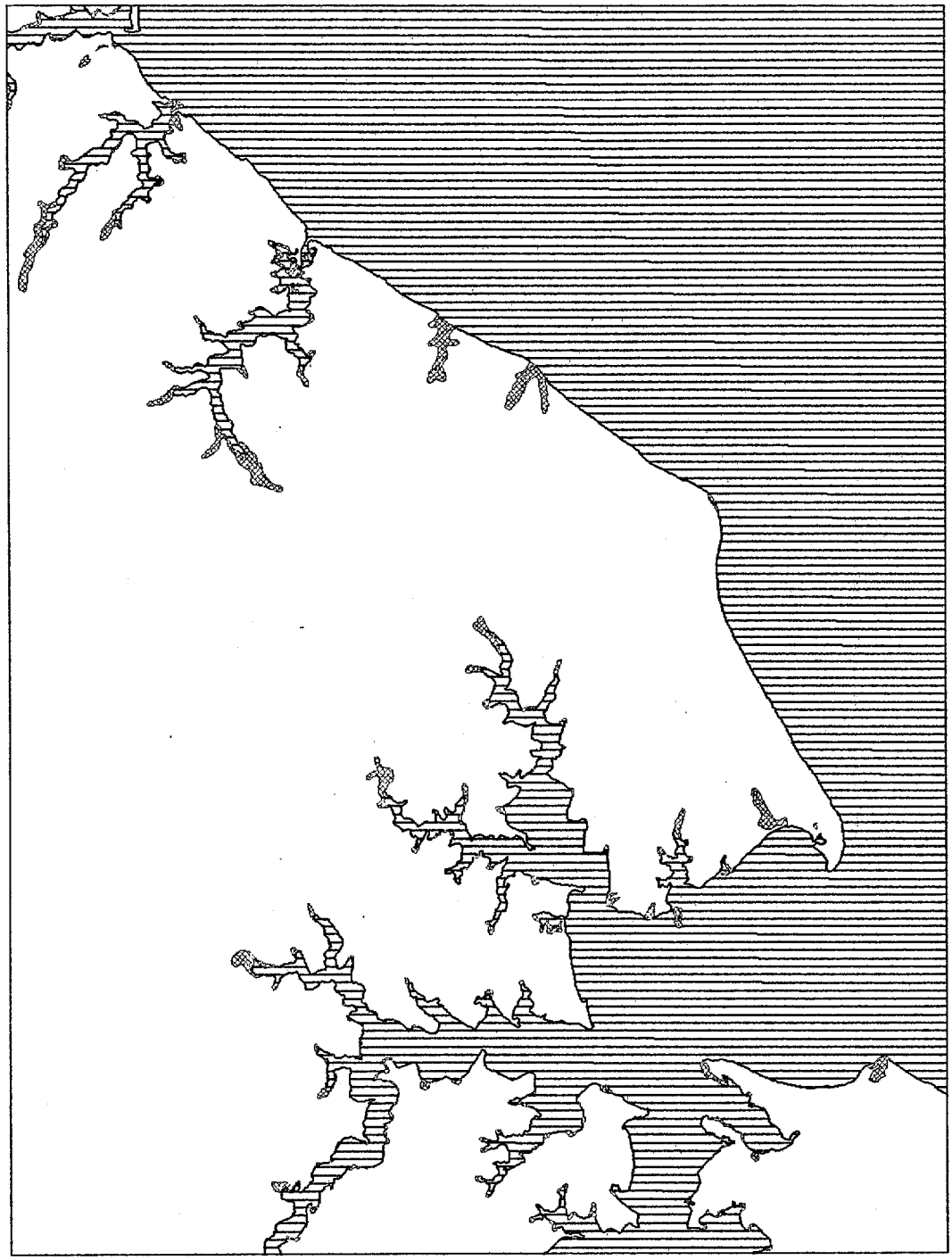
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
IRVINGTON
LANCASTER CO

TM15910

WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
KINSALE
WESTMORELAND CO

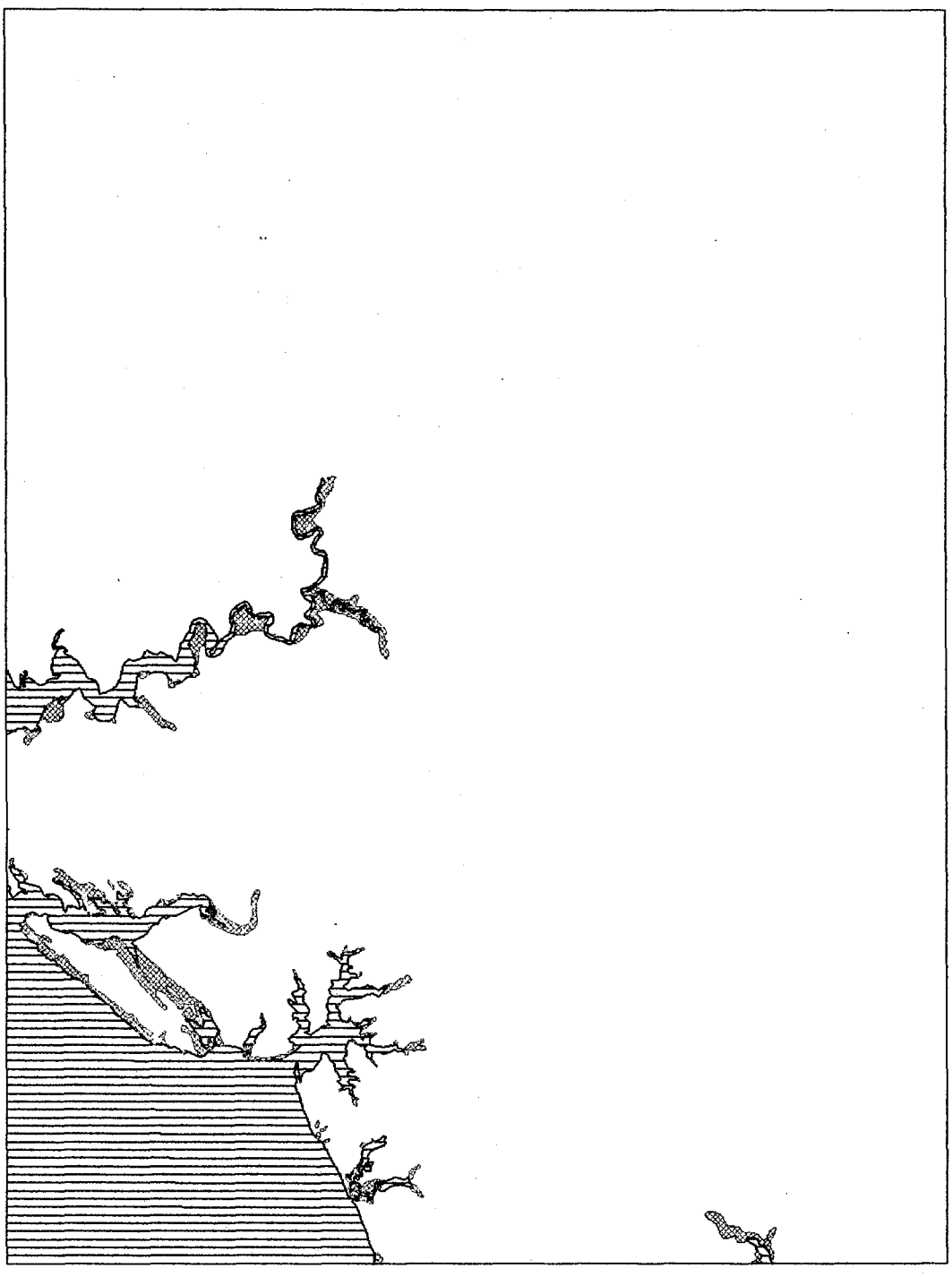
TMI5813

WETLANDS
WATER

VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
LANCASTER
LANCASTER CO

TMI5911

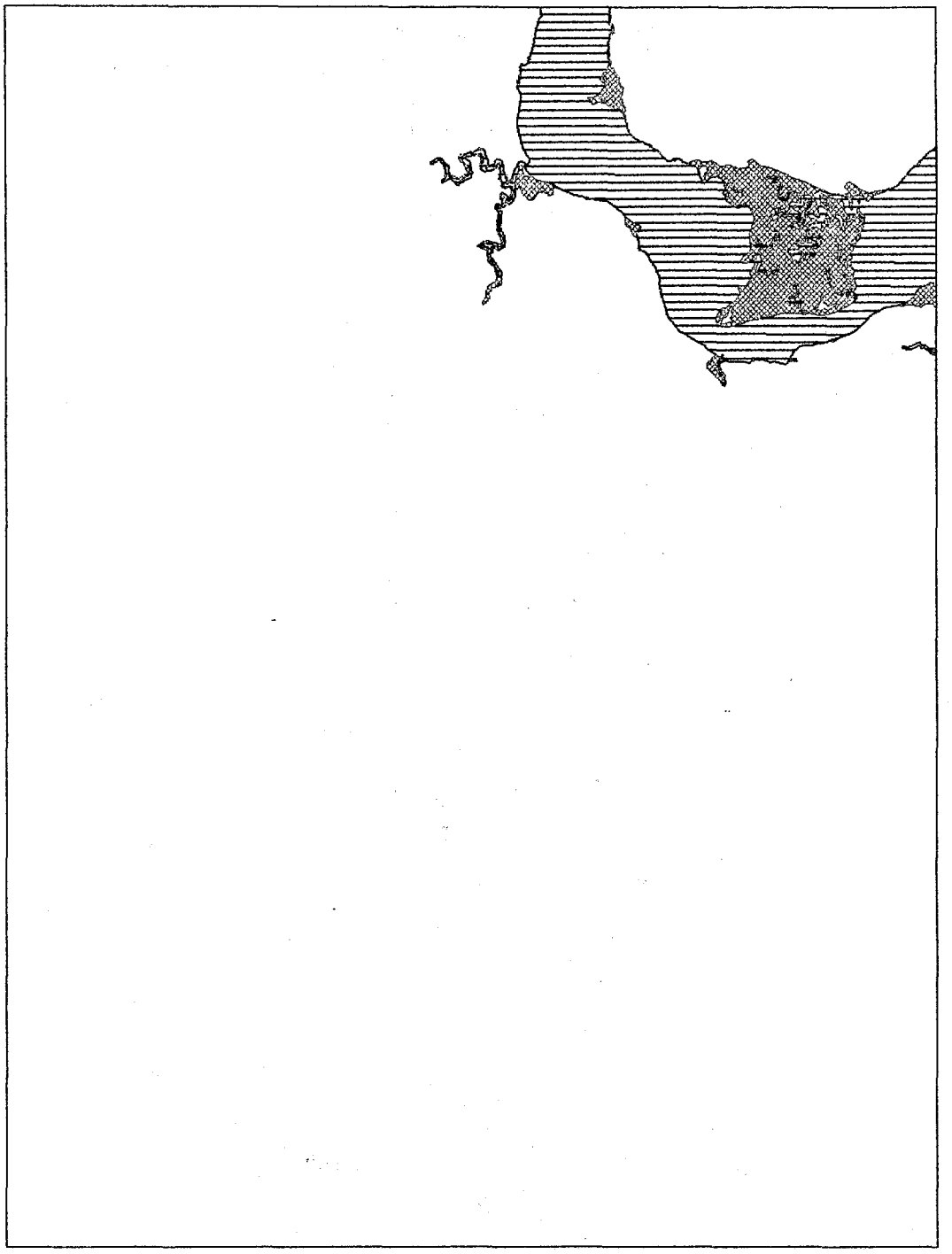
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
LIVELY
LANCASTER CO

TMI5811

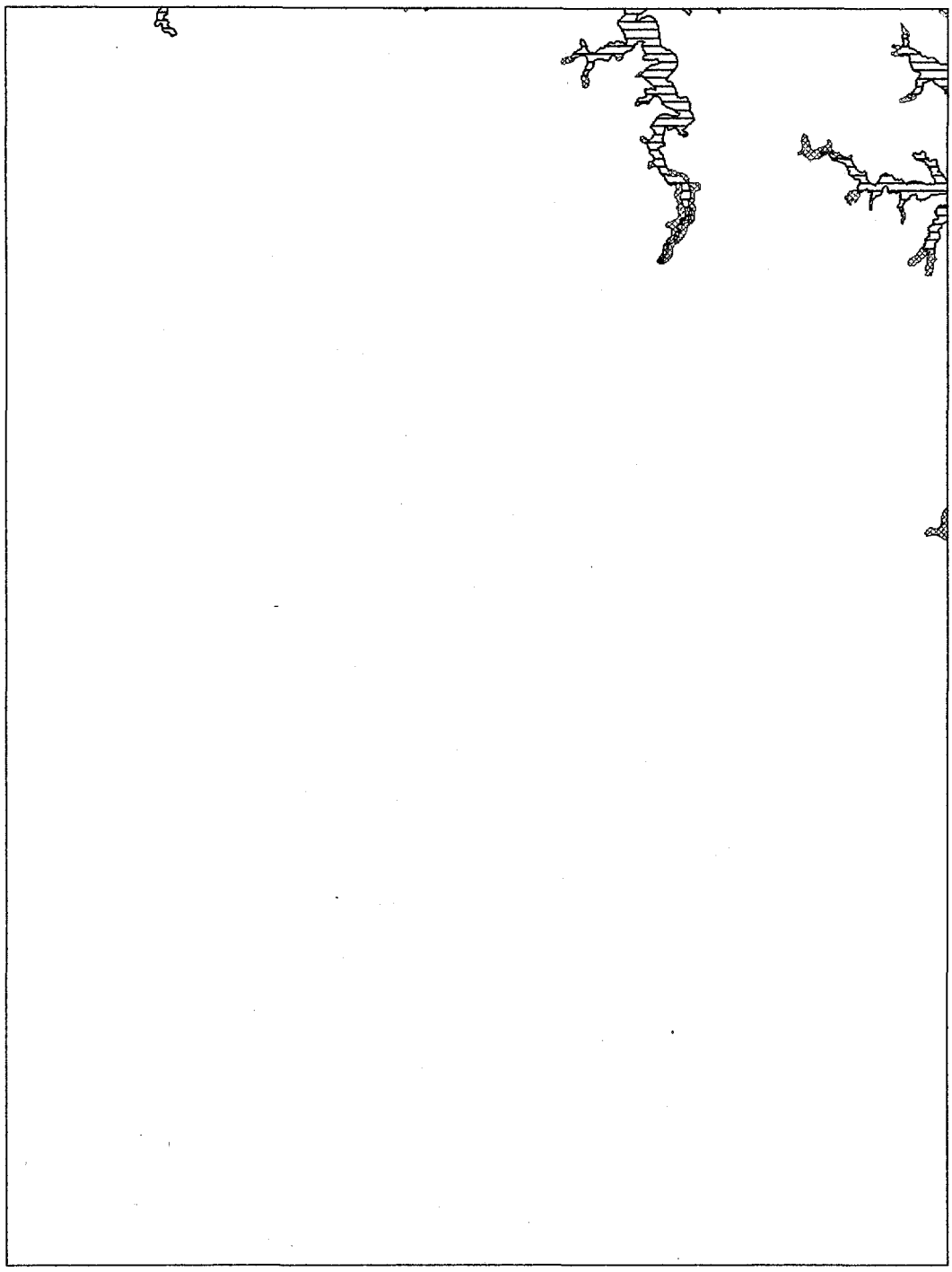
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
LORETTO
WESTMORELAND CO

TMI5413

WETLANDS
WATER

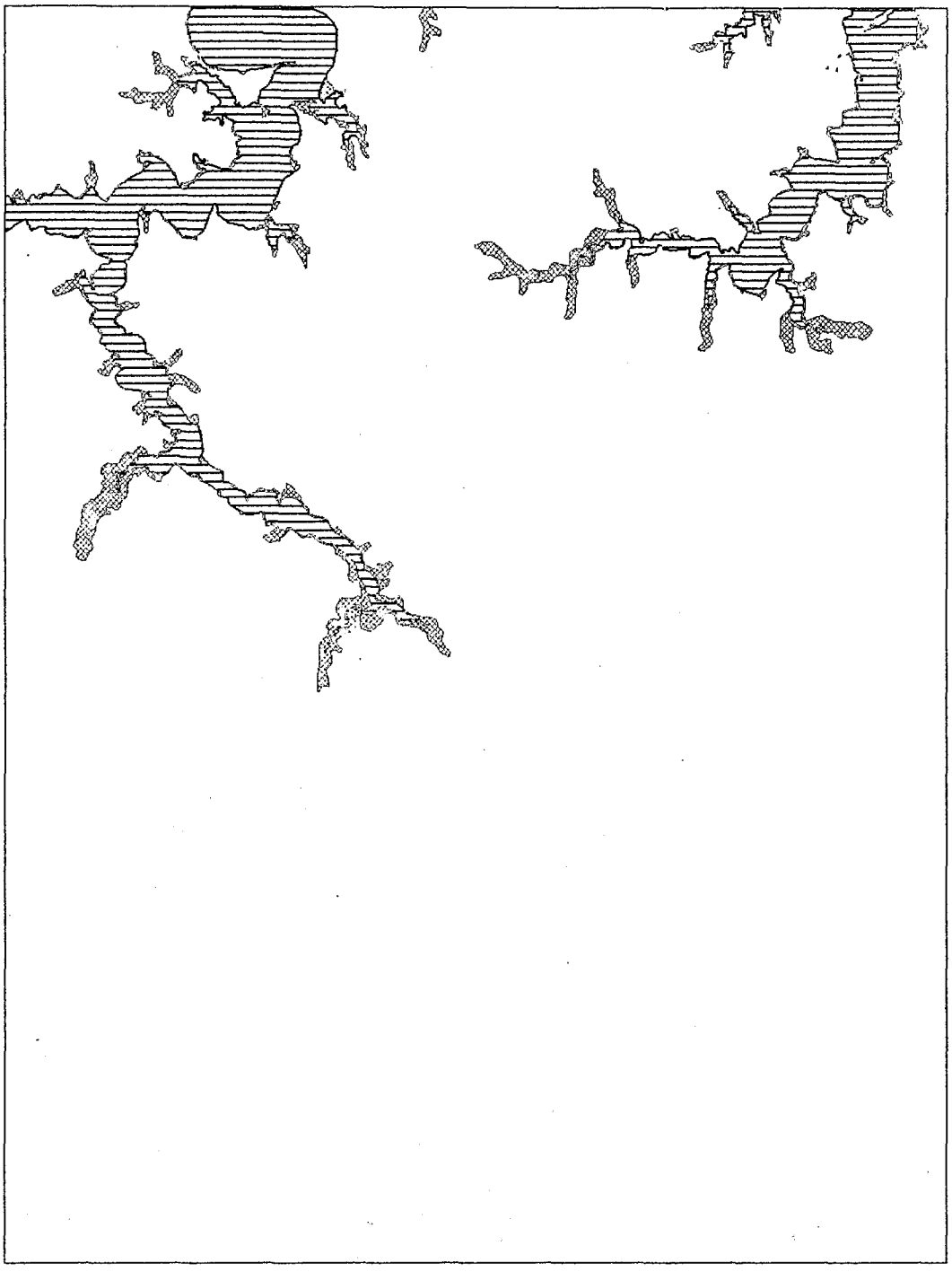


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
LOTTSBURG
NORTHUMBERLAND COUNTY

TMI5812

WETLANDS

WATER

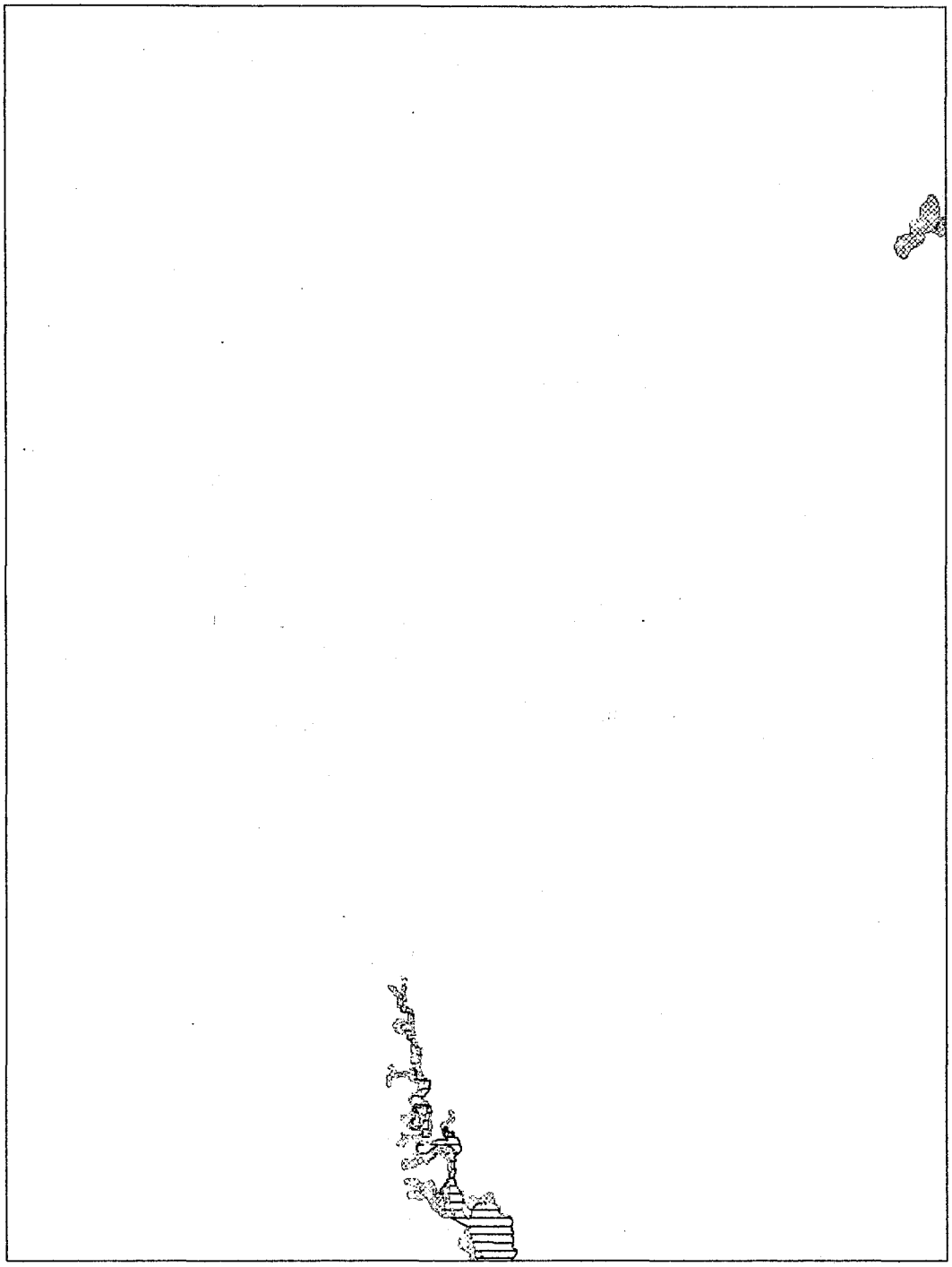


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
MACHODOC
WESTMORELAND COUNTY

TMI5713

WETLANDS

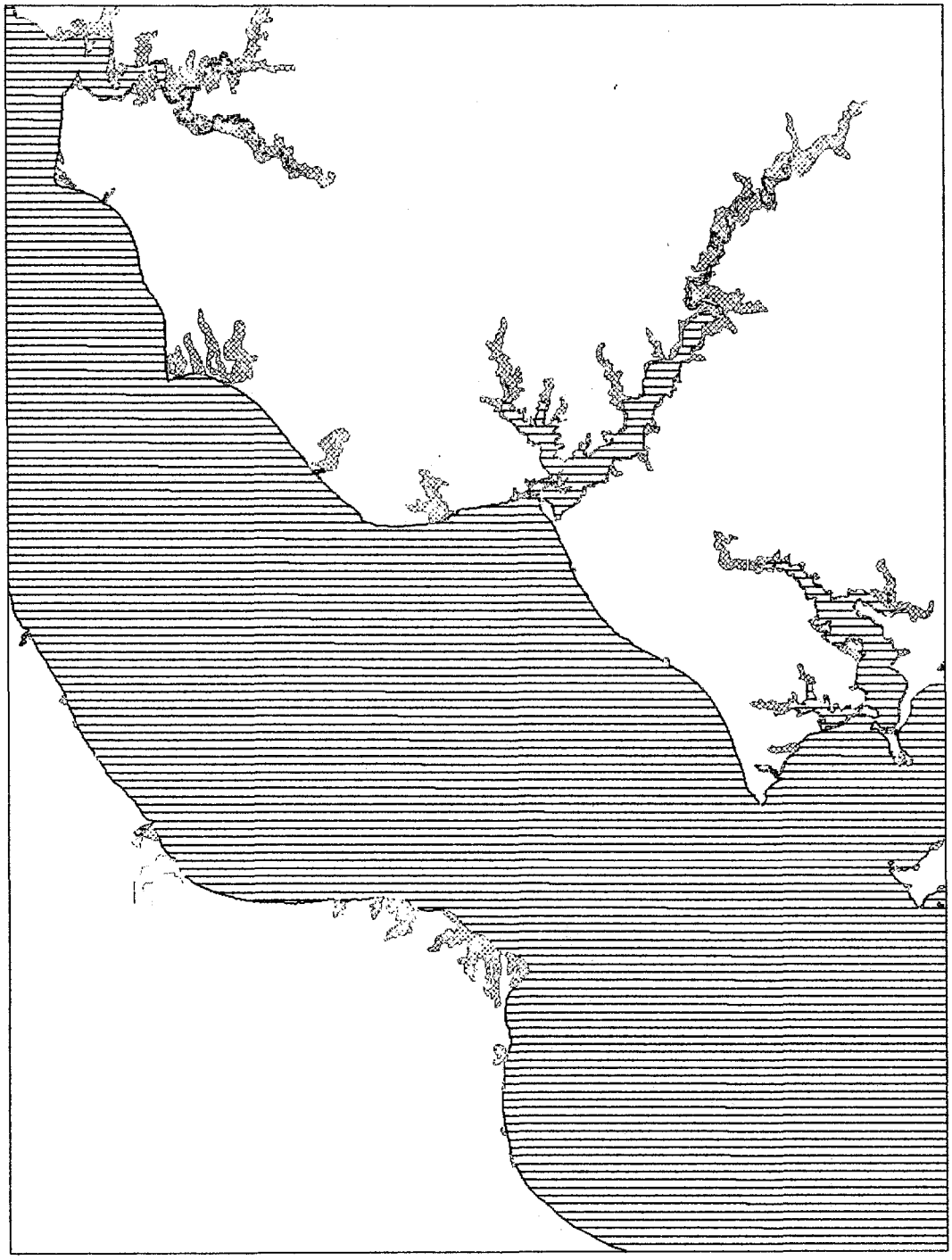
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
MONTROSS
WESTMORELAND CO

TMI5613

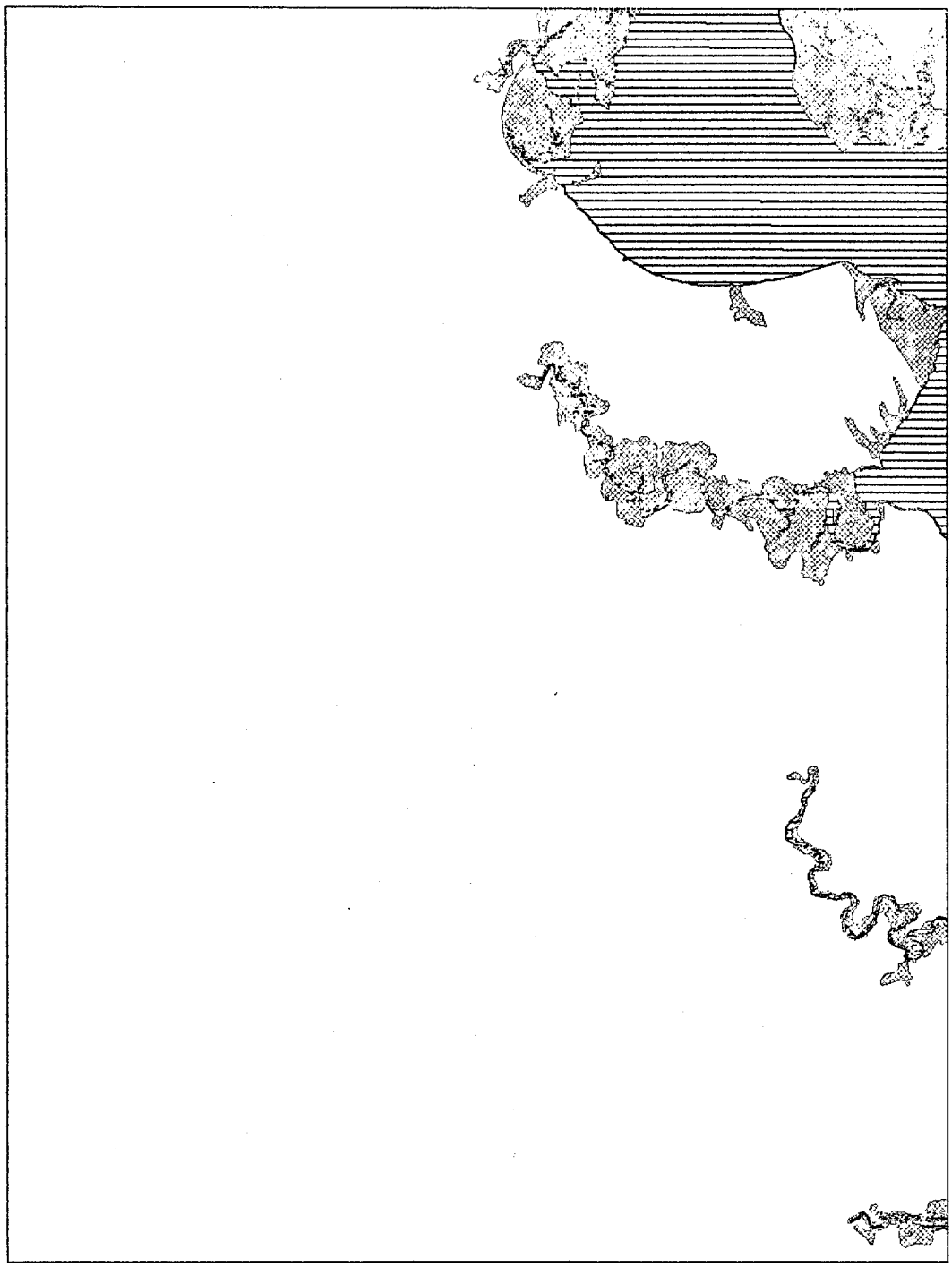
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
MORATICO
RICHMOND CO

TMI5711

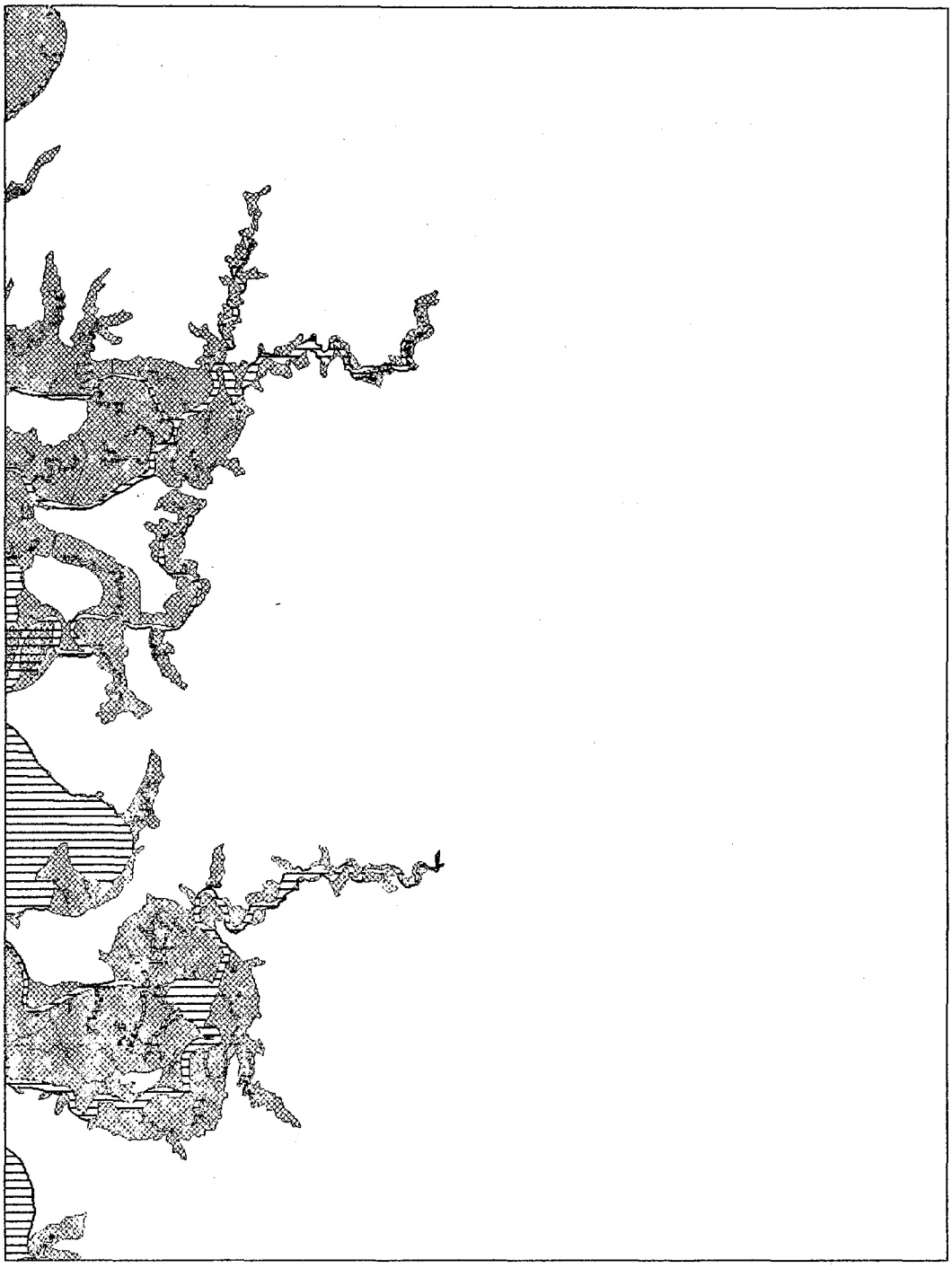
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
MT. LANDING
ESSEX CO

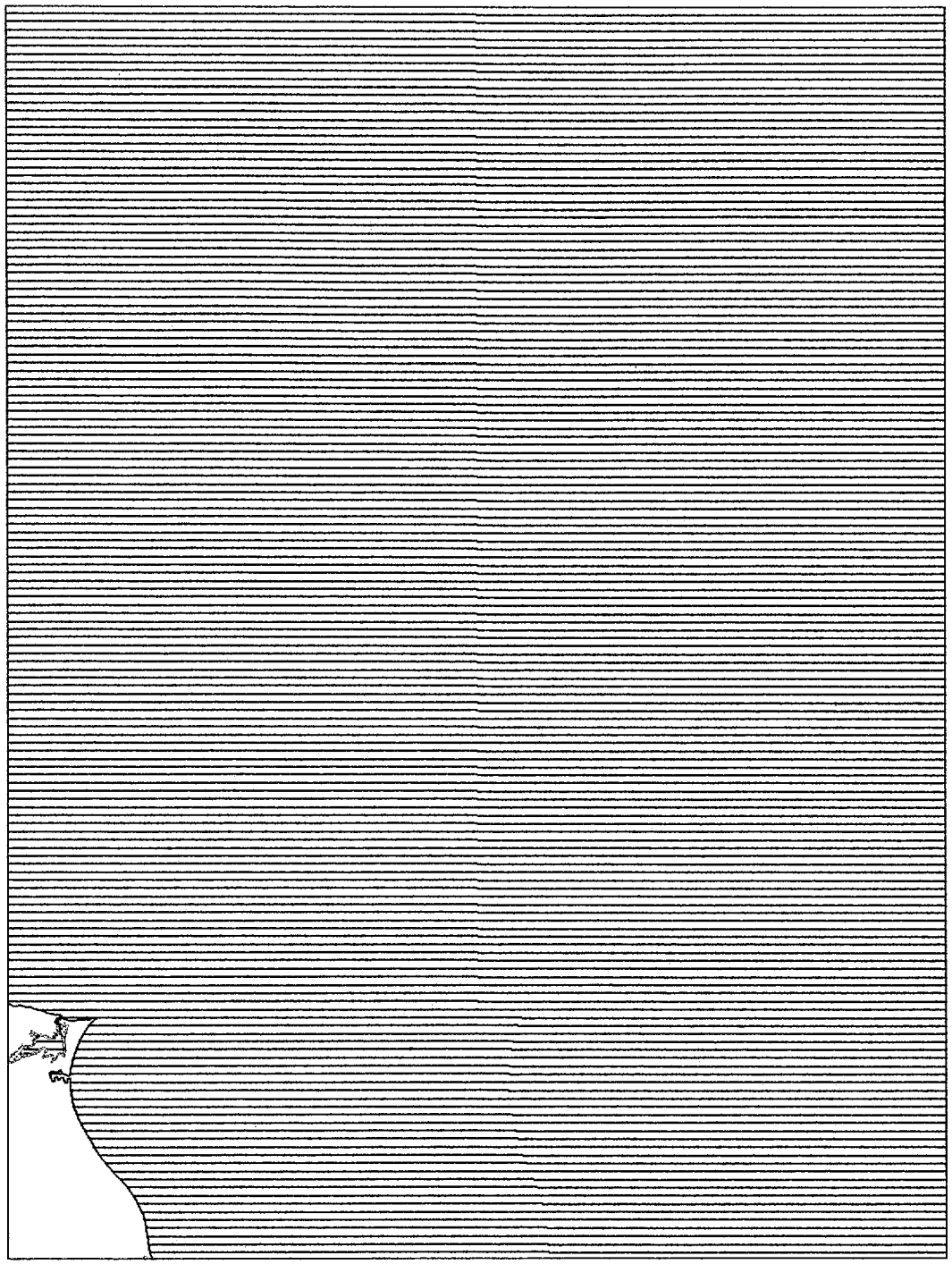
TMI5512

WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
NORGE
JAMES CITY COUNTY

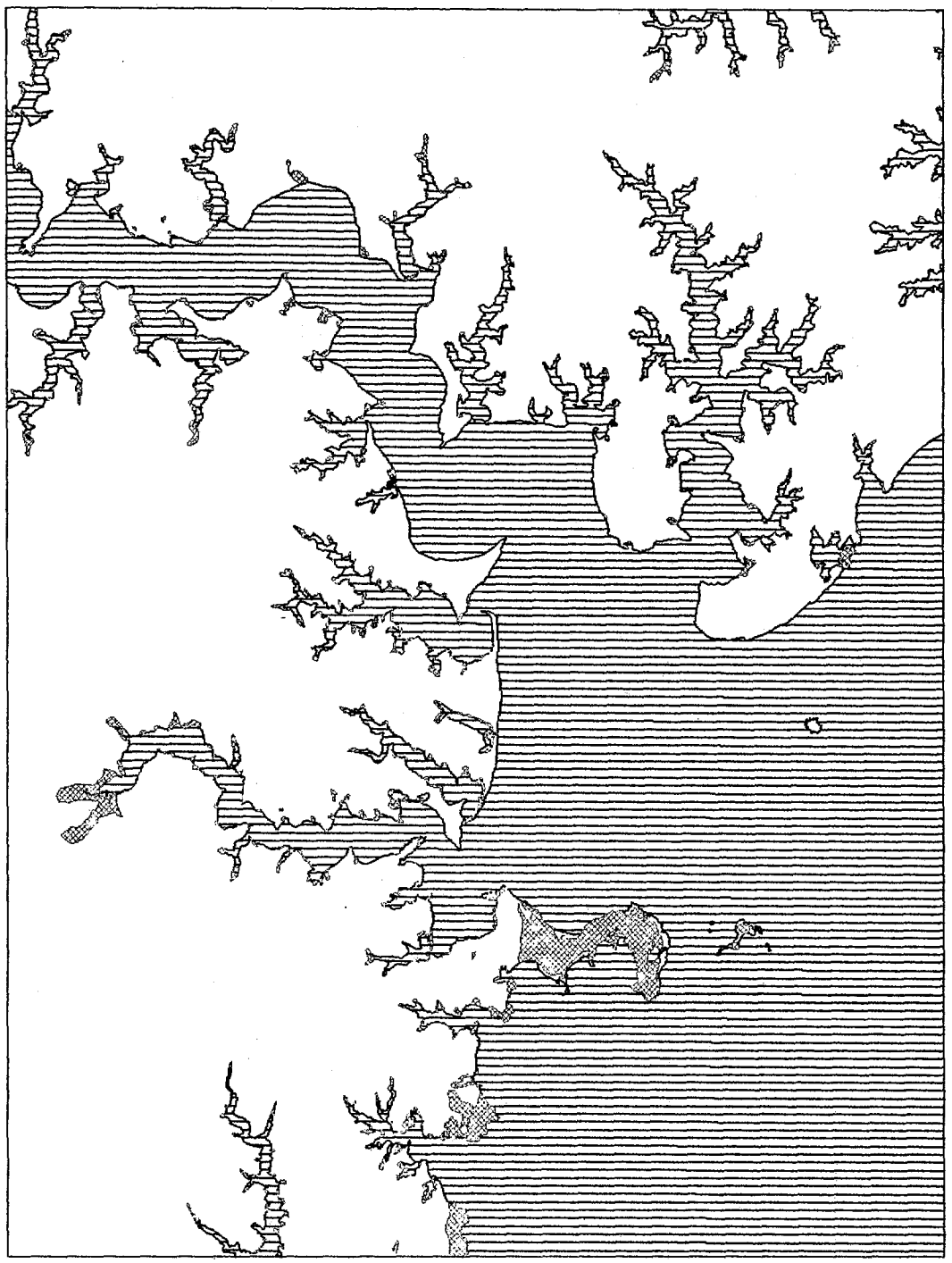
TMI5607
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
PINEY POINT
WESTMORELAND CO

TMI5814

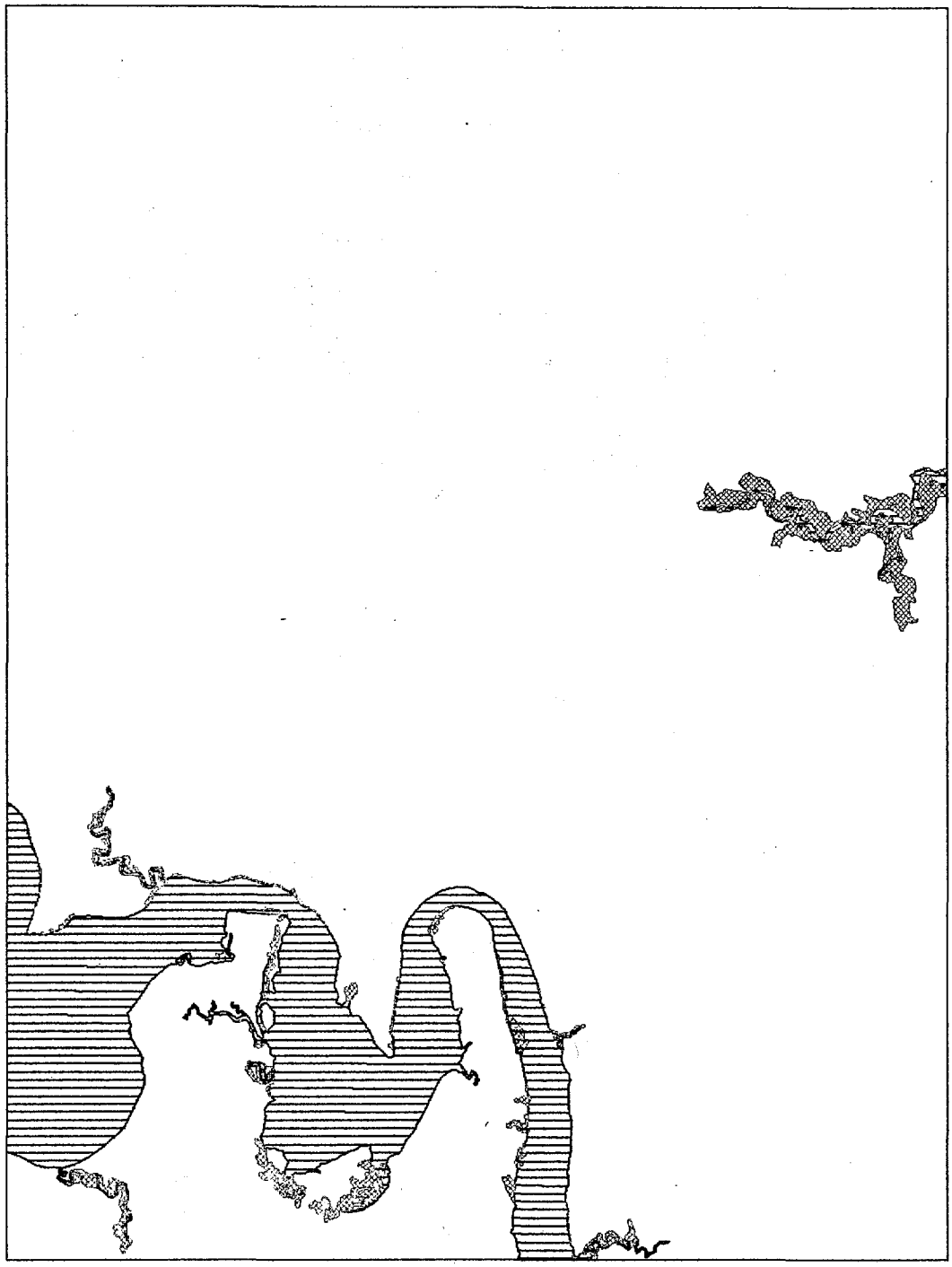
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
REEDVILLE
NORTHUMBERLAND CO

TMI6011

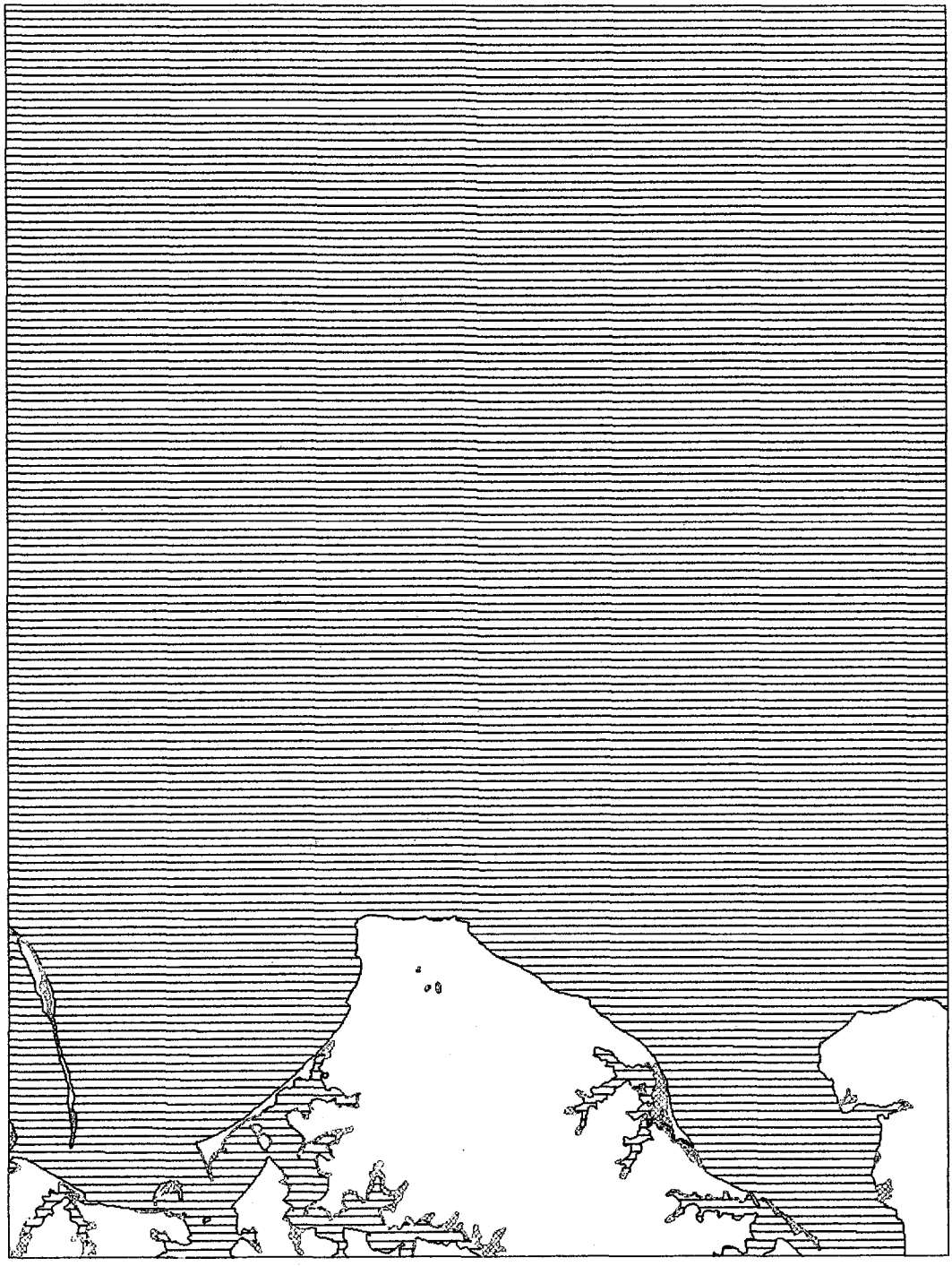
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
ROLLINS FORK
WESTMORELAND CO

TMI5414

WETLANDS
WATER

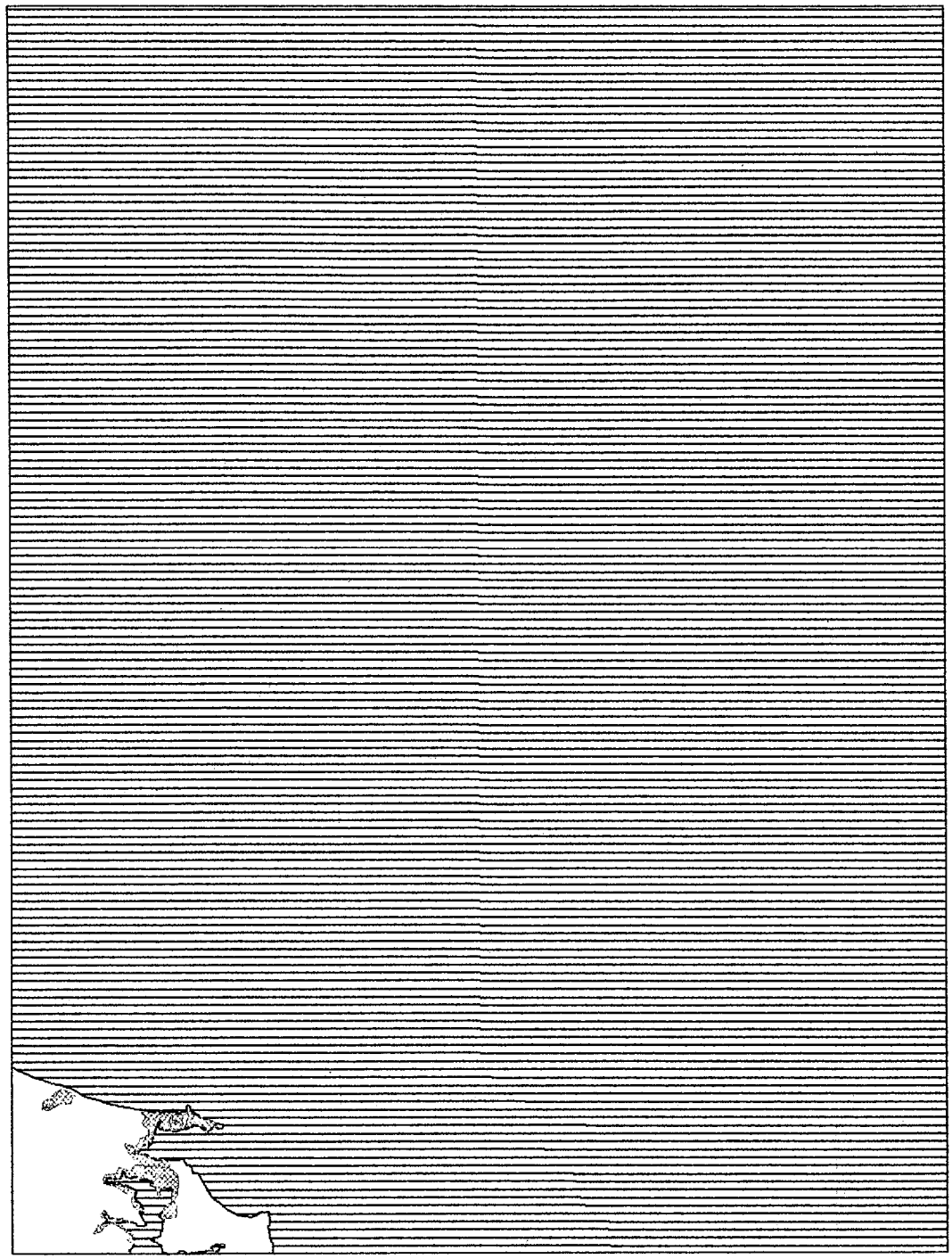


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
ST. CLEMENTS ISLAND
WESTMORELAND COUNTY

TMI5714

WETLANDS

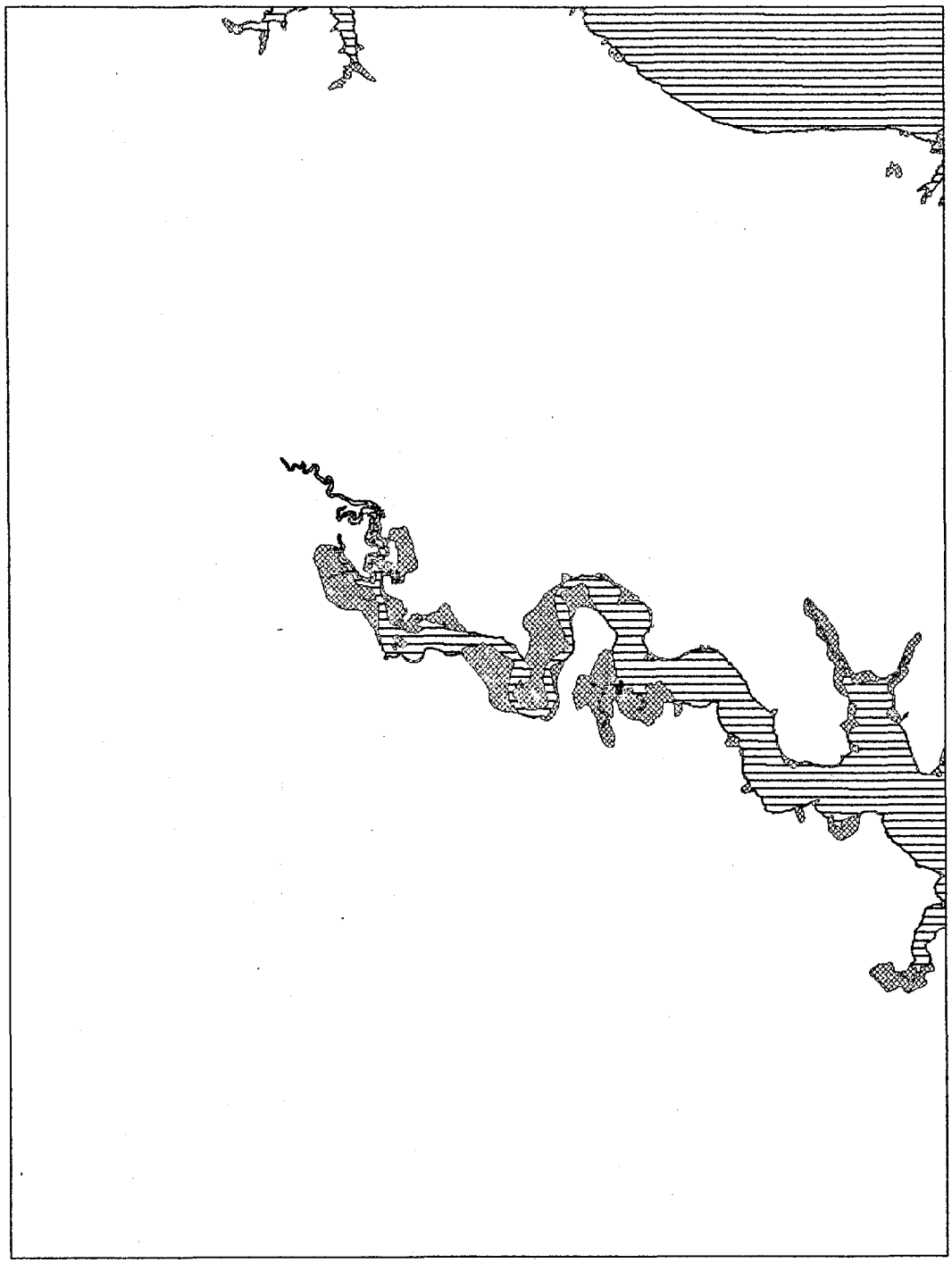
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
ST. GEORGE ISLAND
NORTHUMBERLAND CO

TMI5913

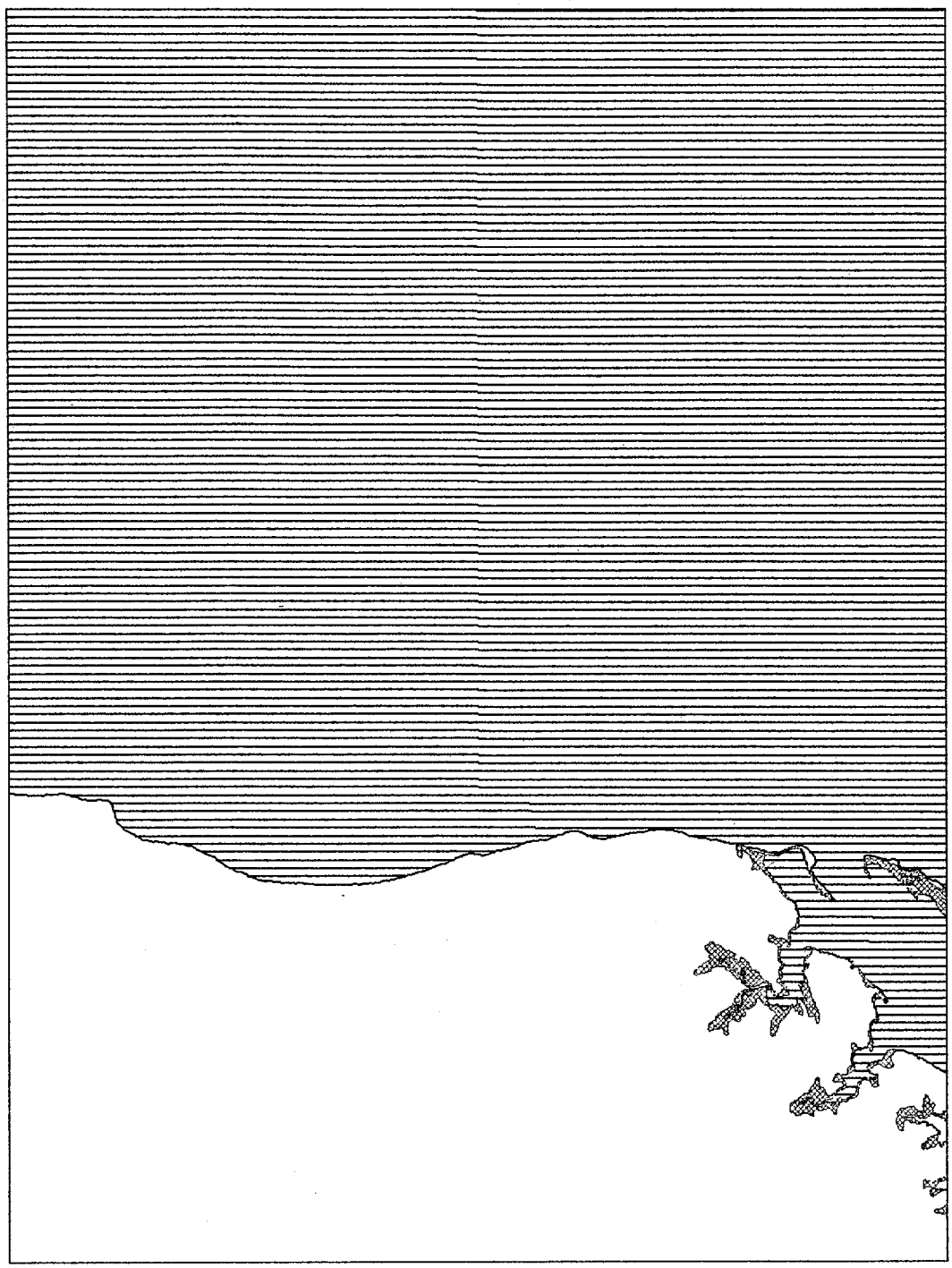
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
SALUDA
MIDDLESEX CO

TMI5809

WETLANDS
WATER

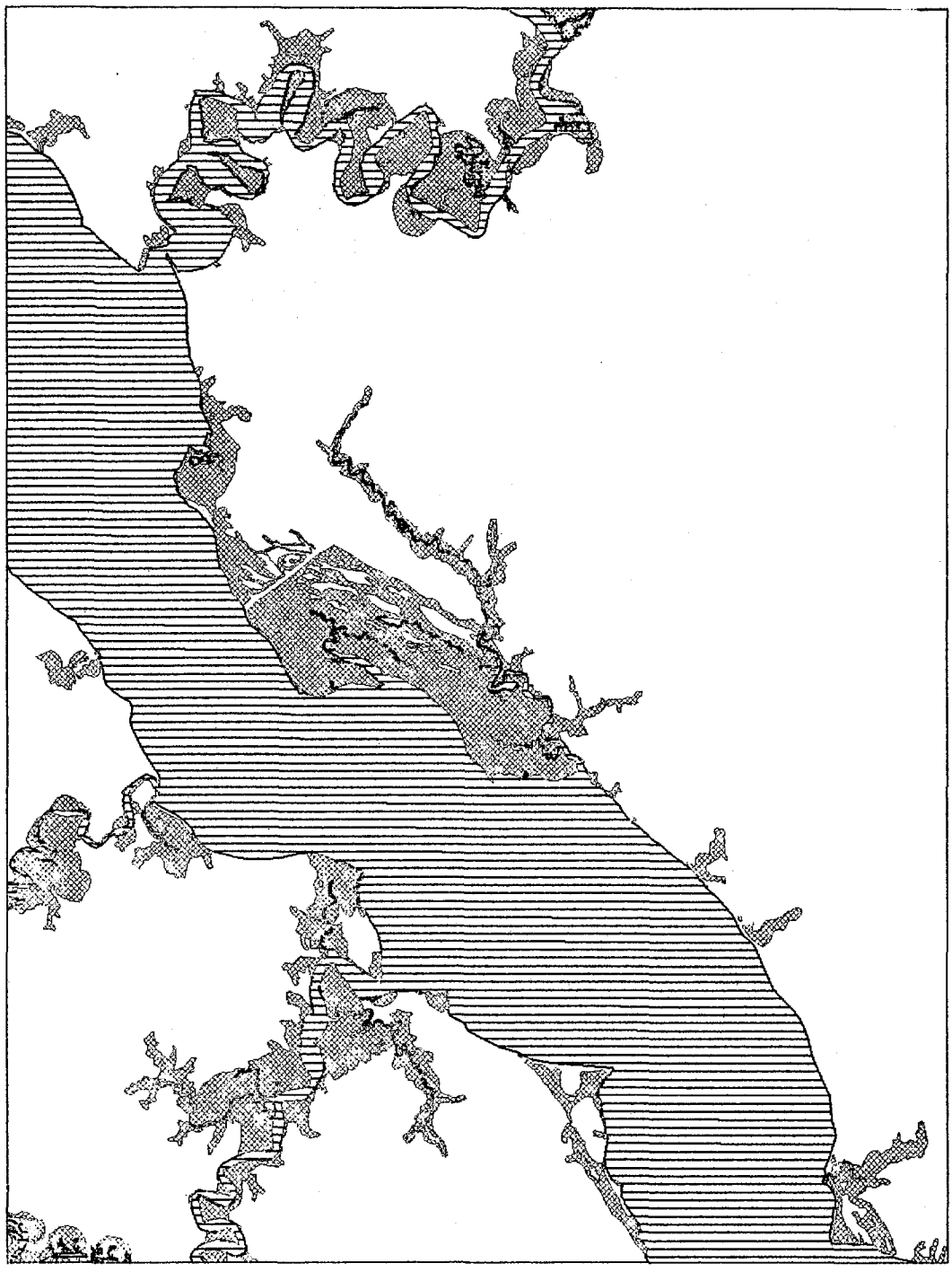


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
STRATFORD HALL
WESTMORELAND COUNTY

TMI5614

WETLANDS

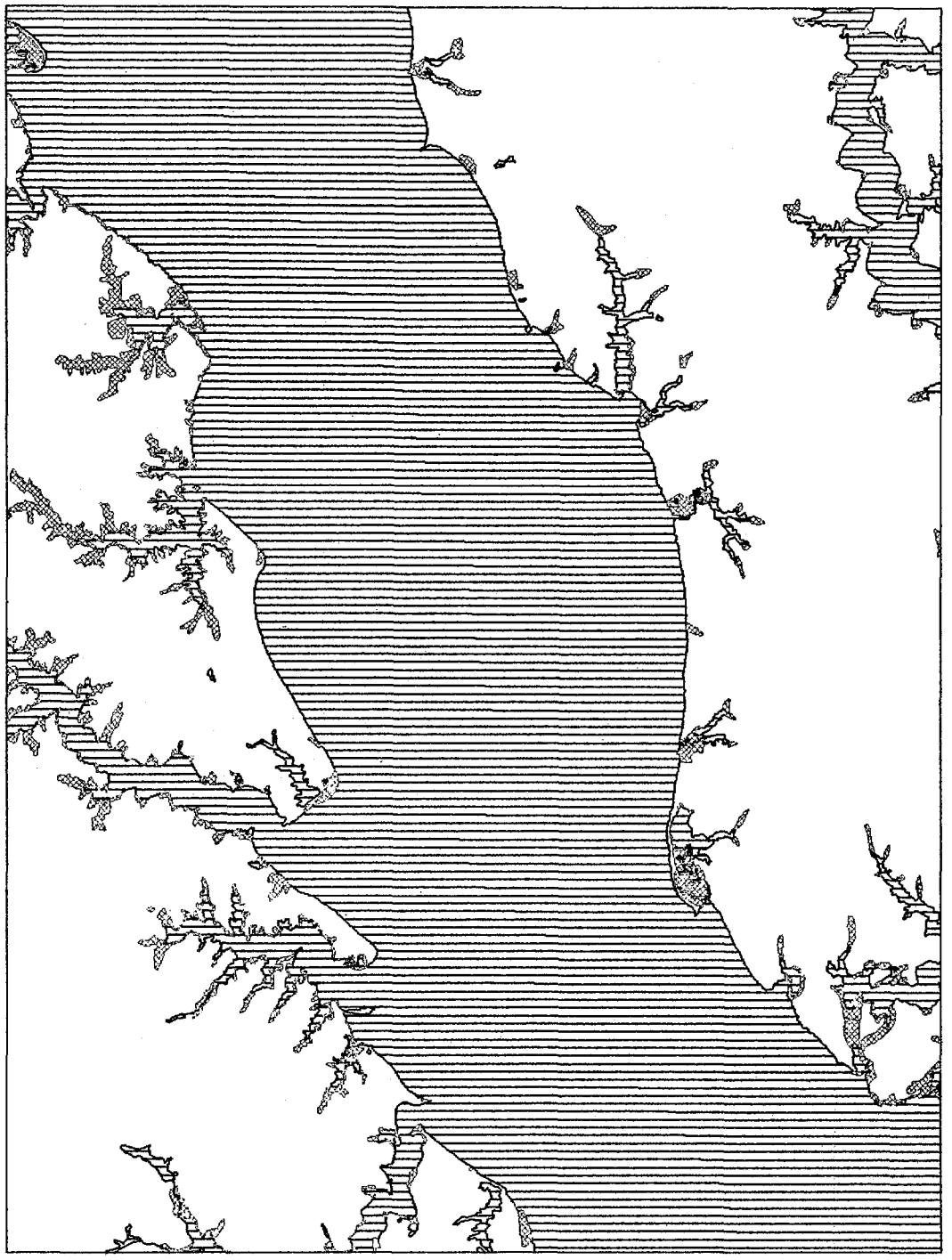
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
TAPPAHANNOCK
RICHMOND CO

TMI5612

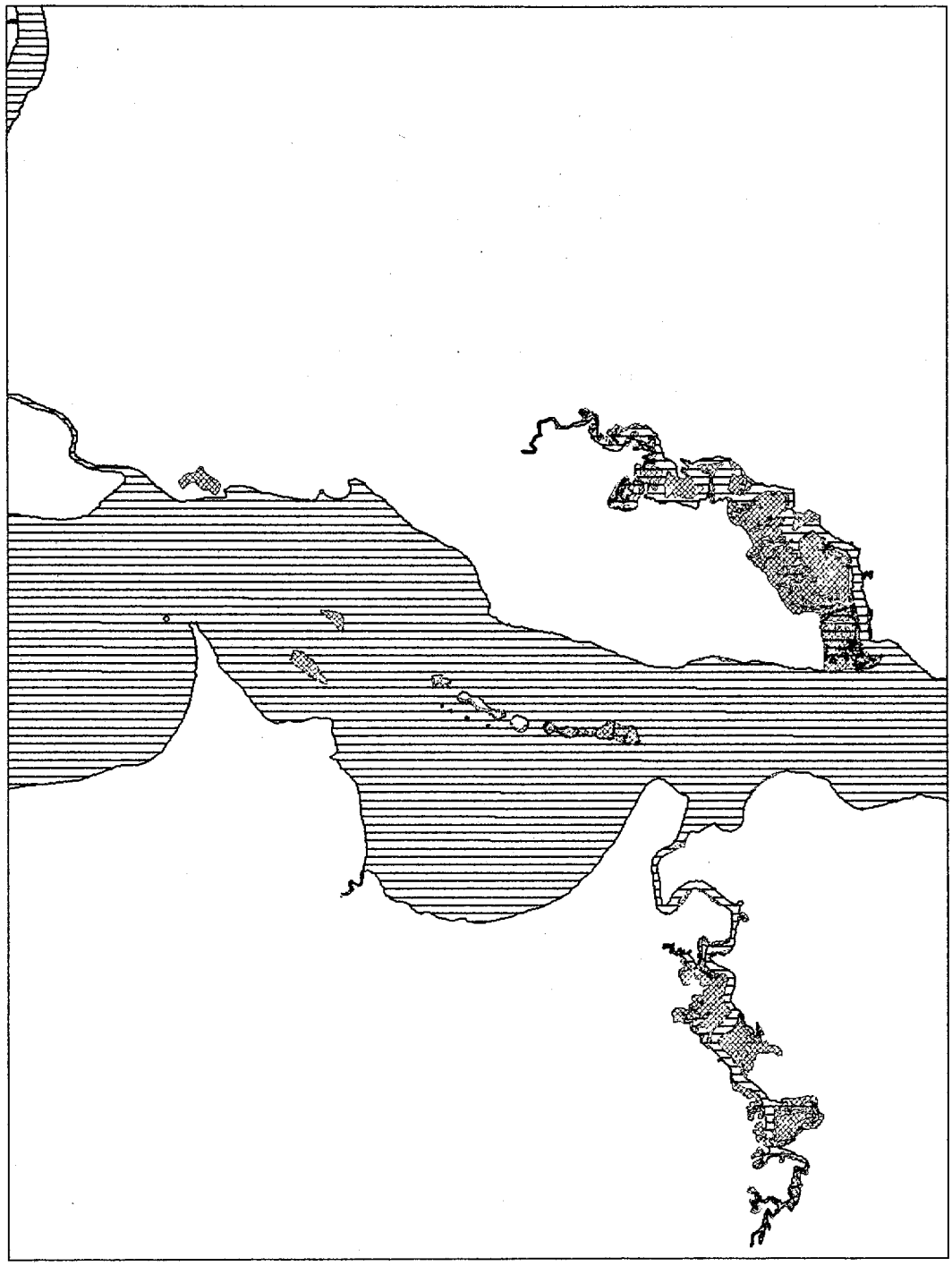
WETLANDS
WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
URBANNA
LANCASTER CO

TMI5810

WETLANDS
WATER

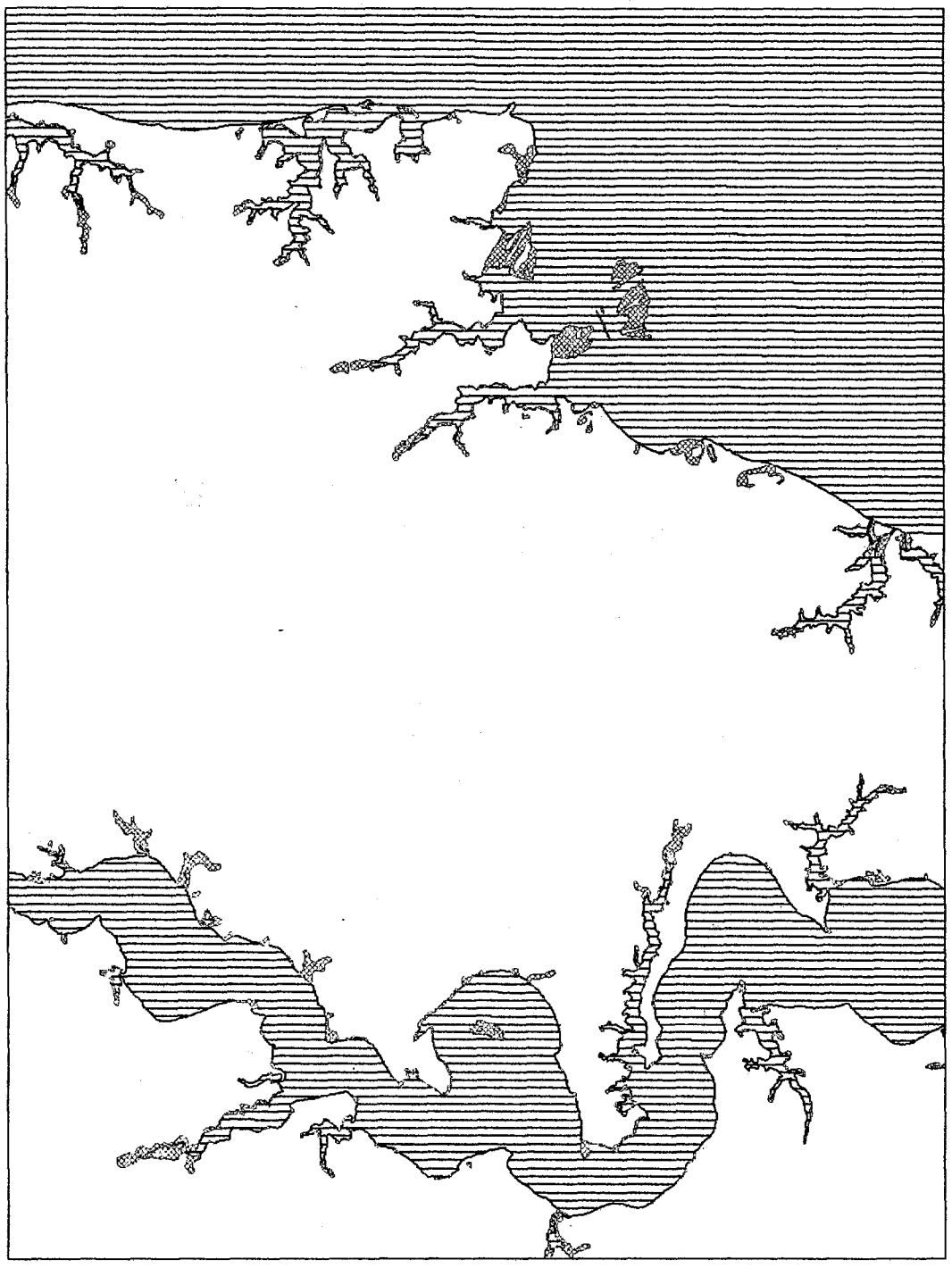


VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
WESTOVER
CHARLES CITY COUNTY

TMI5307

WETLANDS

WATER



VIMS COASTAL INVENTORIES
VIMS TIDAL MARSH INVENTORY
WILTON
MIDDLESEX CO

TMI5909

WETLANDS
WATER

CHAPTER XII. LEFT/RIGHT BANK COVERAGE

XII. LEFT/RIGHT BANK COVERAGE

The Left/Right Bank (LRB) shoreline coverage is derived from the U.S. Geological Survey Digital Line Graph Data (DLG). The coverage is created by selecting only the shoreline from the hydrography Digital Line Graph. The survey was originally digitized by the U.S. Geological Survey at a scale of 1:100,000. The coverage serves as the current base shoreline for much of the VIMS Shoreline Inventory Report data collected in the mid to late 70's and updated in 1985, and the transportation network coverage supplied by the U.S. Geological Survey. Plots of the 1:100,000 shoreline can be found in the River Reach Coverage section (ref. Chapter 13). A folio is not included in this chapter, but documentation is presented here.

GEOGRAPHIC DATA SET DESCRIPTION

VIMS GIS Lab Prefix LRB

Data Layer Name LEFT/RIGHT BANK

Description ONLY LEFT/RIGHT BANK SHORELINE DERIVED FROM THE USGS DIGITAL LINE GRAPH OF HYDROGRAPHY.

Year(s) Collected VARIES

Base Maps used for Digitizing DIGITIZED BY USGS

Digitizing Scale 1:100000

Geographic Extent SELECTED AREAS OF COASTAL VIRGINIA

How Collected (Describe):

THE HYDROGRAPHY COMES FROM USGS MAPS.

Actual/Intended Use or Purpose:

THE LRB COVERAGE IS USED AS A BASE MAP FOR WORK DONE ON A 1:100000 SCALE (IE. RIVER REACH COVERAGE INFORMATION).

VA TIDAL RIVERS INVENTORY

AVERAGE TIME AND DISC SPACE USED*

LEFT-RIGHT BANK COVERAGE

MAP NUMBER	TIME	DISC SPACE
LRB5608	1.5	47104
LRB5710	1.0	38912
LRB5809	1.5	45056
LRB5506	1.75	40960
LRB5609	1.25	45056
LRB5905	.75	47104
LRB5512	1.75	38912
LRB6005	2.75	63488
LRB6207	.25	36864
LRB6206	.25	36864
LRB6012	.5	51200
LRB5706	1.5	61440
LRB5707	1.0	51200
LRB5606	.75	47104
LRB5904	3.0	45056
LRB5611	1.0	36864
LRB5805	1.5	53248
LRB6004	1.25	53248
LRB6104	.75	61440
LRB5207	1.25	53248
LRB5307	1.25	38912
LRB5407	.75	36864
LRB6305	1.25	45056
LRB6306	2.0	71680
LRB6308	2.0	59392
LRB6309	2.0	47104
LRB6310	.75	34816
LRB6312	1.0	53248
LRB6411	1.25	55296
LRB6410	2.0	59392
LRB6511	1.25	57344
LRB6512	1.25	49152
LRB5507	3.5	65536
AVERAGE	1.5	50088

* TIME IN HOURS, DISC SPACE IN BYTES

CHAPTER XIII. RIVER REACH INFORMATION COVERAGE

XIII. RIVER REACH INFORMATION COVERAGE

The River Reach Information (RVR) coverage contains information collected for the Shoreline Inventory Data Base developed at VIMS in the mid to late 70's, and updated in 1985. The data base houses information on shoreline type, usage, condition, stability, and stabilization structures on a reach by reach basis. An eight digit code identifies a reach based on water body, county, and reach number. Attribute tables store data for each reach and can be linked with the reach identification number using a code called REACHCODE. Reach locations/codes are digitized and plotted on the LRB, 1:100,000 shoreline coverage (ref. Chapter 12). Methodologies for data collection and analysis are referenced in the Shoreline Situation Reports (Byrne et al. 1976-1978) published by county at the Virginia Institute of Marine Science, or in Shoreline Erosion in Tidewater Virginia (Byrne and Anderson, 1985), also published at VIMS. A folio of the river reach stations is included in this section. For publication purposes, maps are represented at a scale of 1:68,000. Documentation on this coverage follows.

GEOGRAPHIC DATA SET DESCRIPTION

VIMS GIS Lab Prefix RVR

Data Layer Name RIVER REACH INFORMATION

Description THIS INFORMATION COMES FROM THE VIMS SHORELINE INVENTORY DATA BASE. IT CONTAINS INFORMATION ON SHORELINE REACHES.

Year(s) Collected 1975 - 1985

Base Maps used for Digitizing USGS HYDROGRAPHY DIGITAL LINE GRAPH (DLG)

Digitizing Scale 1:100000

Geographic Extent MOST OF COASTAL VIRGINIA

How Collected (Describe):

ORIGINAL DATA WAS COLLECTED USING MAPS AND VERTICAL PHOTOGRAPHY FOR THE VIMS SHORELINE SITUATION REPORTS. DATA WAS UPDATED IN 1985 WITH A VIDEO SURVEY.

Actual/Intended Use or Purpose:

TO ANALYZE THE PHYSICAL AND GEOGRAPHICAL PROPERTIES, LAND USE PATTERNS, AND GENERAL SHORELINE CONDITIONS ON A REACH BASIS.

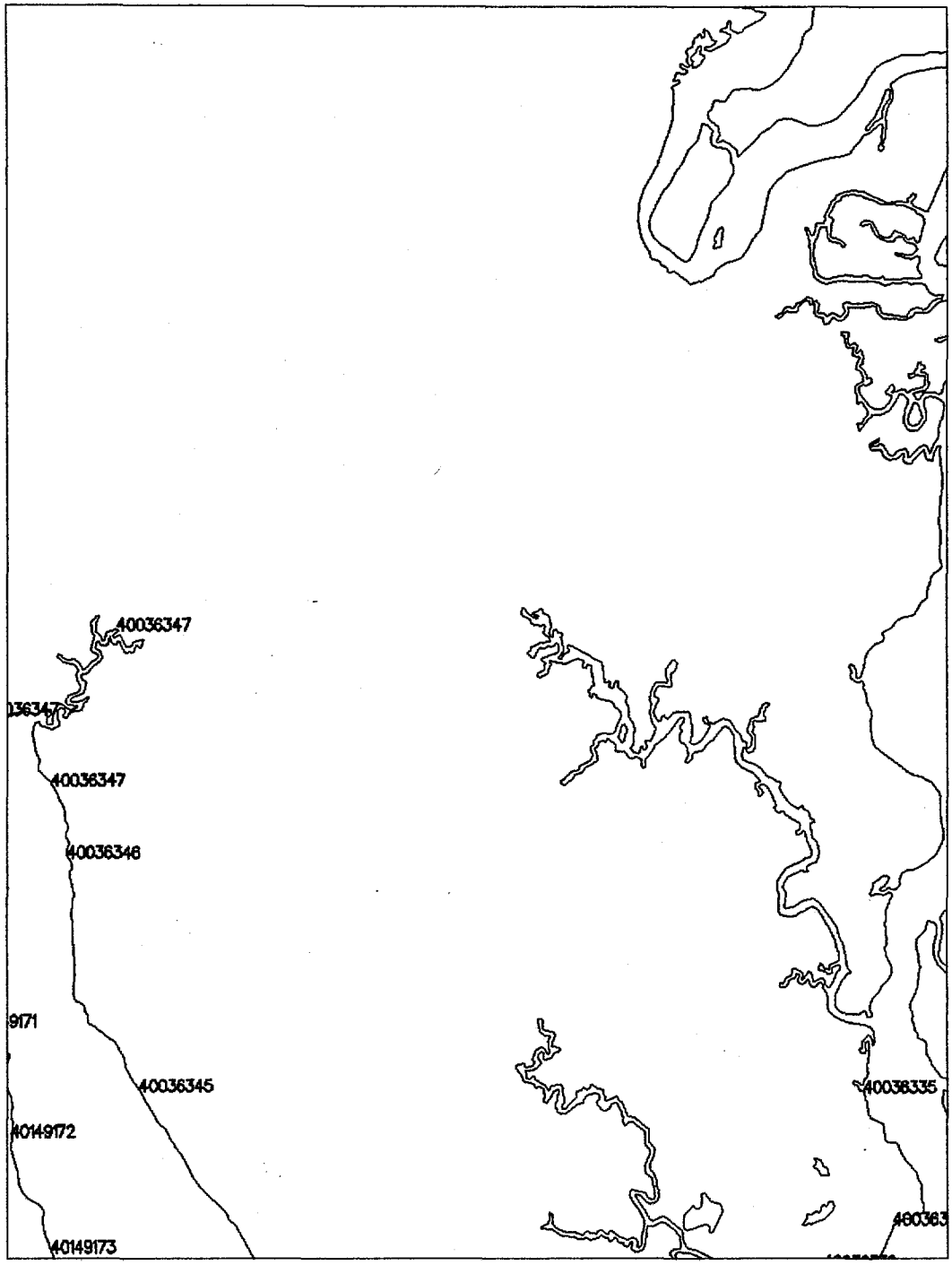
VA TIDAL RIVERS INVENTORY

AVERAGE TIME AND DISC SPACE USED*

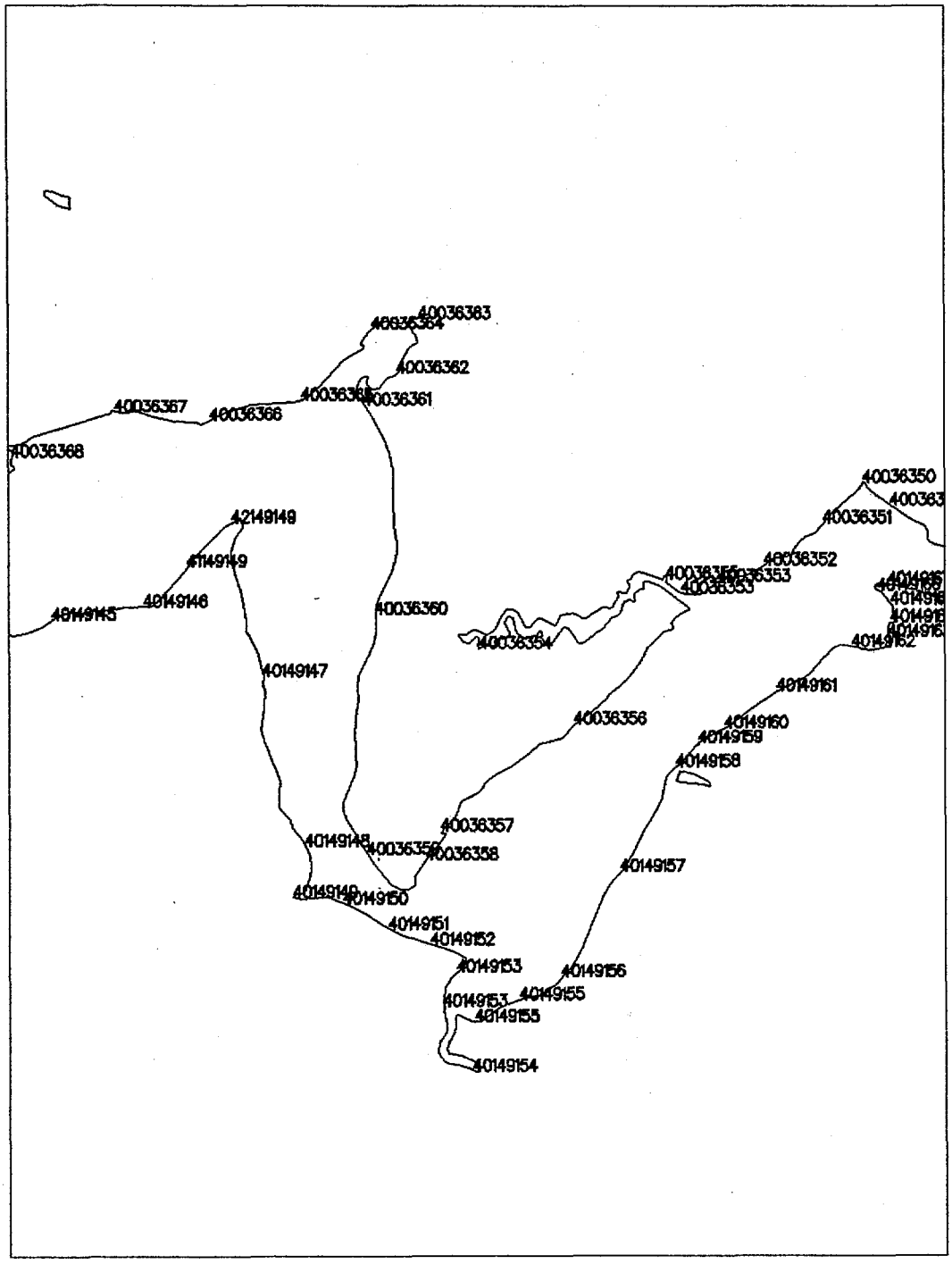
RIVER REACH COVERAGE

MAP NUMBER	TIME	DISC SPACE
RVR5512	1.25	16384
RVR5710	1.5	28672
RVR5809	2.0	16384
RVR5608	1.0	47104
RVR5506	2.0	36864
RVR5609	1.75	43008
RVR6005	2.0	63488
RVR5905	1.5	45056
RVR6206	1.5	36864
RVR6207	1.25	36864
RVR6012	1.0	49152
RVR5706	2.25	59392
RVR5707	.75	49152
RVR5606	2.0	47104
RVR5904	1.75	43008
RVR5611	1.75	34816
RVR5805	1.25	53248
RVR6004	1.0	53284
RVR6104	.75	61440
RVR5207	1.75	49152
RVR5307	1.75	38912
RVR5407	2.25	36864
RVR6305	1.55	45056
RVR6306	1.0	63488
RVR6308	1.0	55296
RVR6309	1.5	45056
RVR6310	1.25	34816
RVR6312	1.75	49152
RVR6411	1.75	55296
RVR6410	1.25	55296
RVR6511	1.25	55296
RVR6512	1.25	53248
RVR5507	1.75	61440
RVR5811	1.5	46683
RVR5906	1.5	46683
RVR6007	1.5	46683
RVR6008	1.5	46683
AVERAGE	1.5	46683

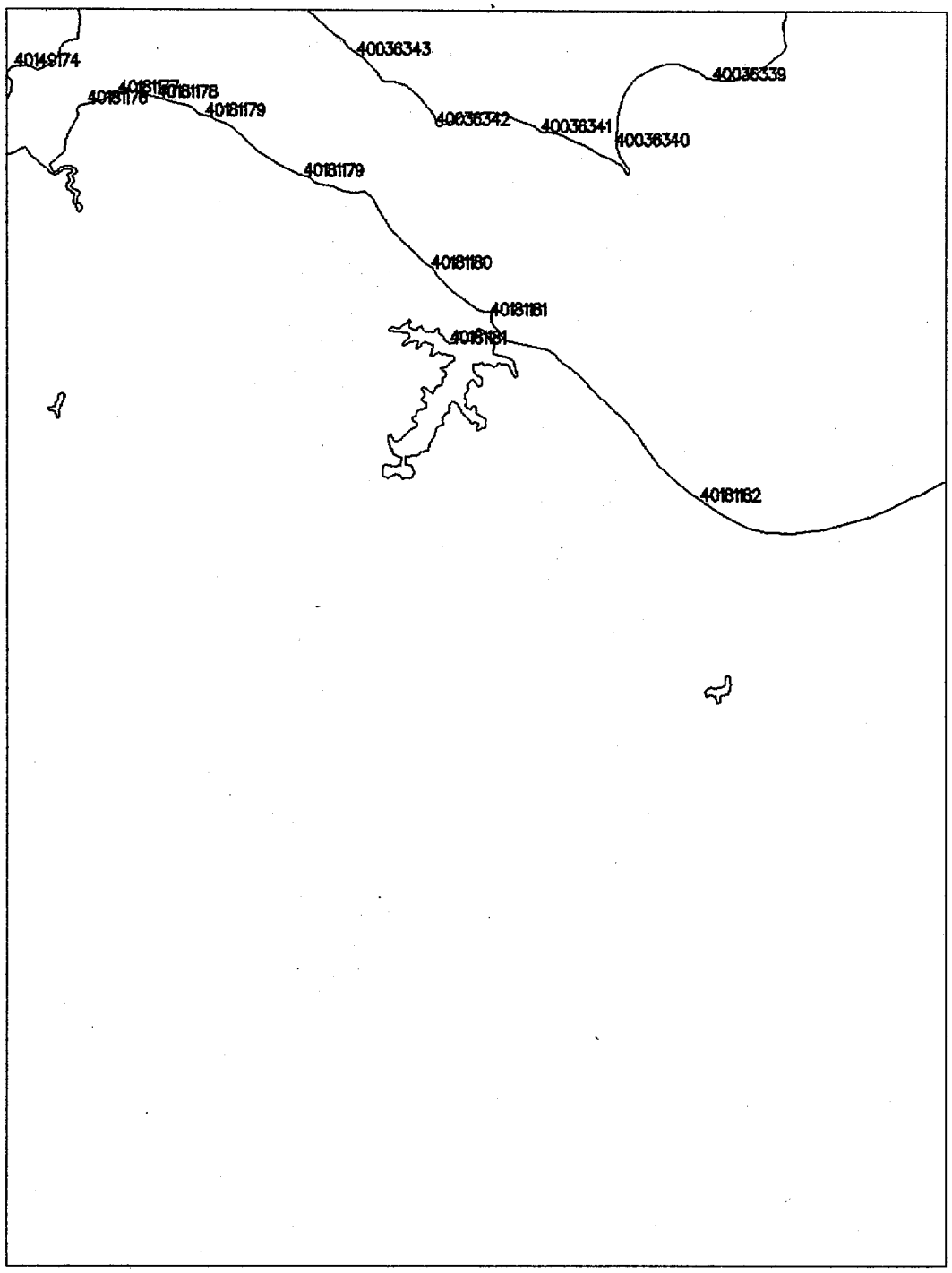
* TIME IN HOURS, DISC SPACE IN BYTES



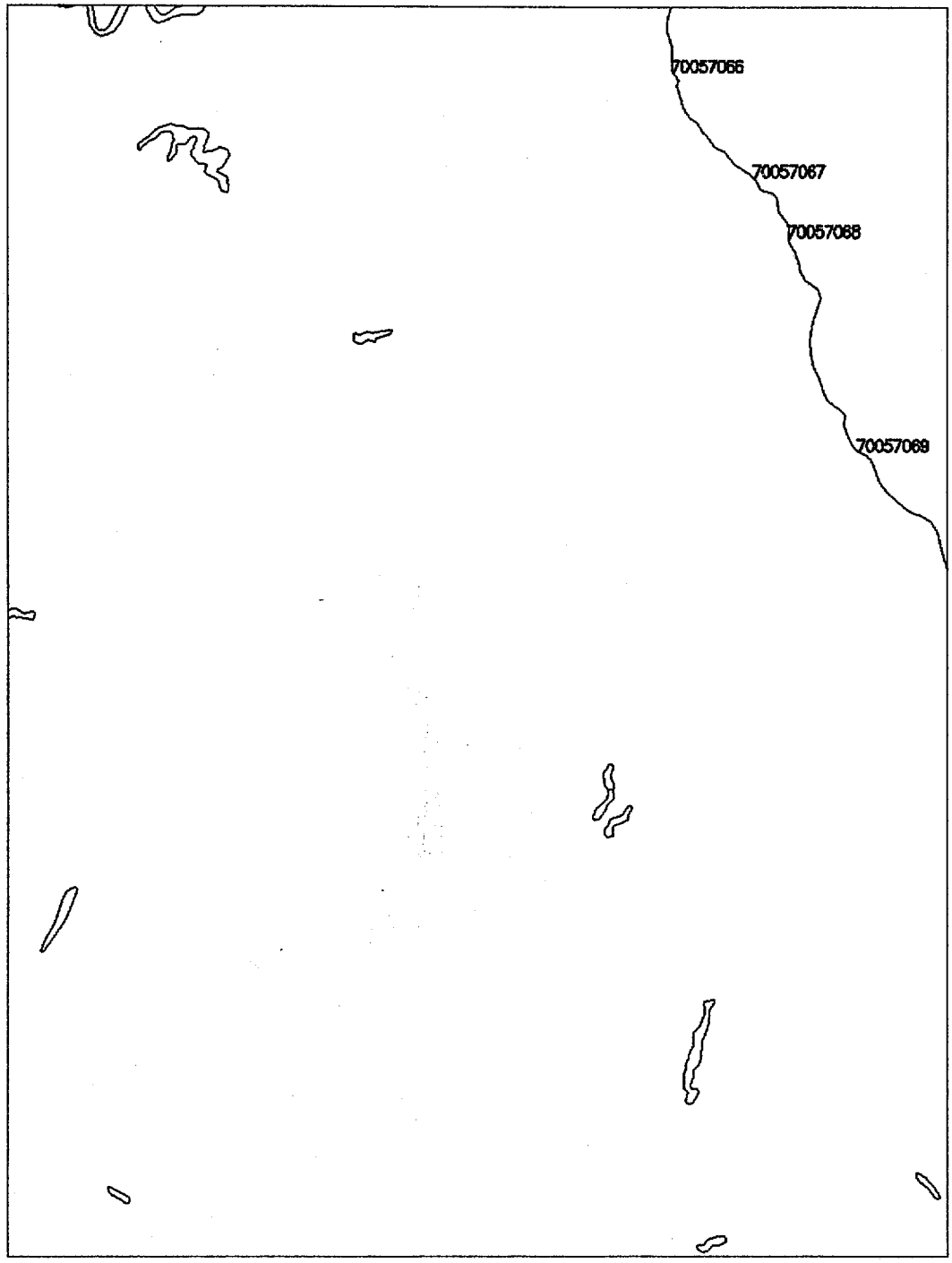
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
BRANDON QUAD



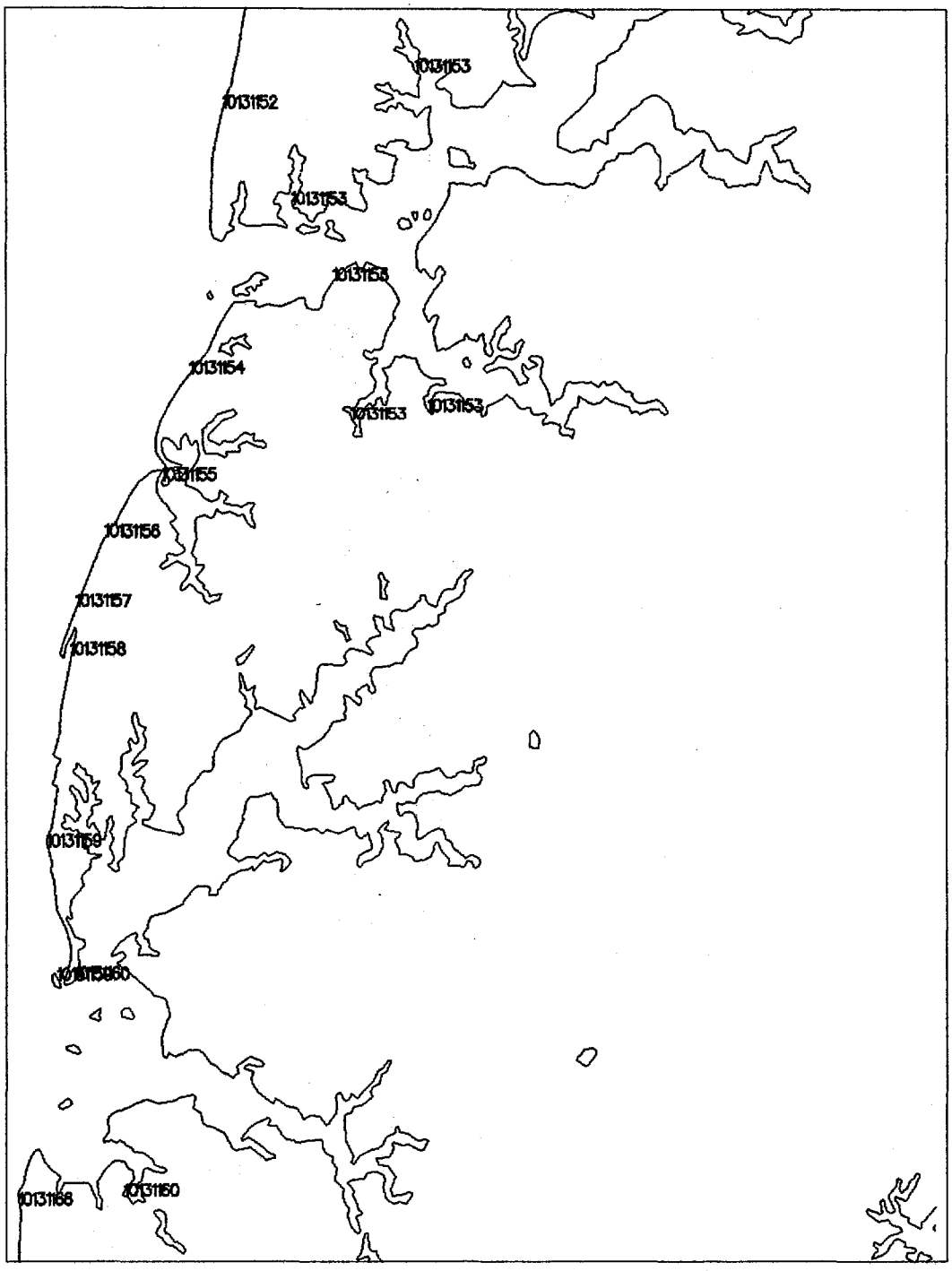
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
CHARLES CITY QUAD



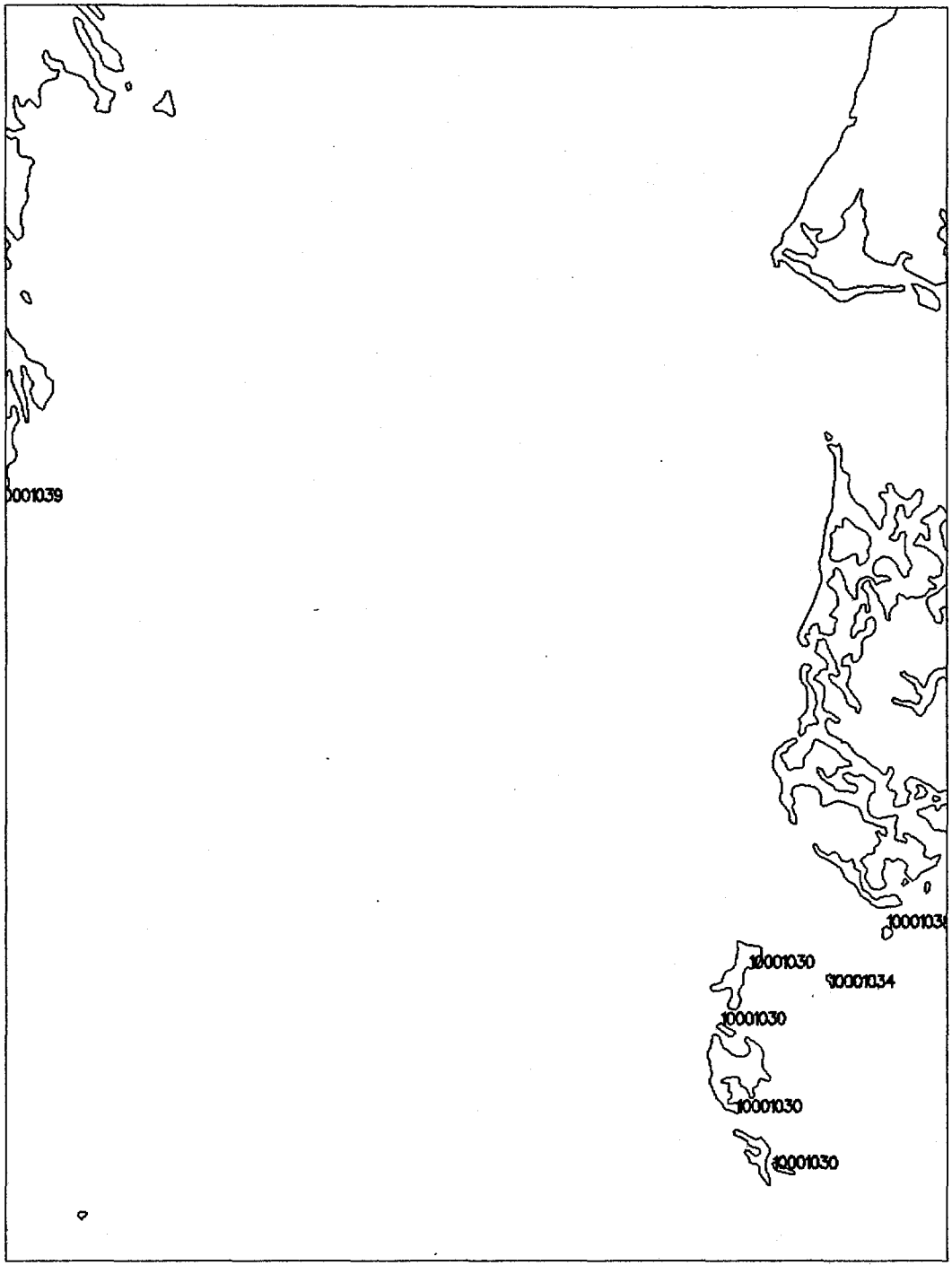
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
CLAREMONT QUAD



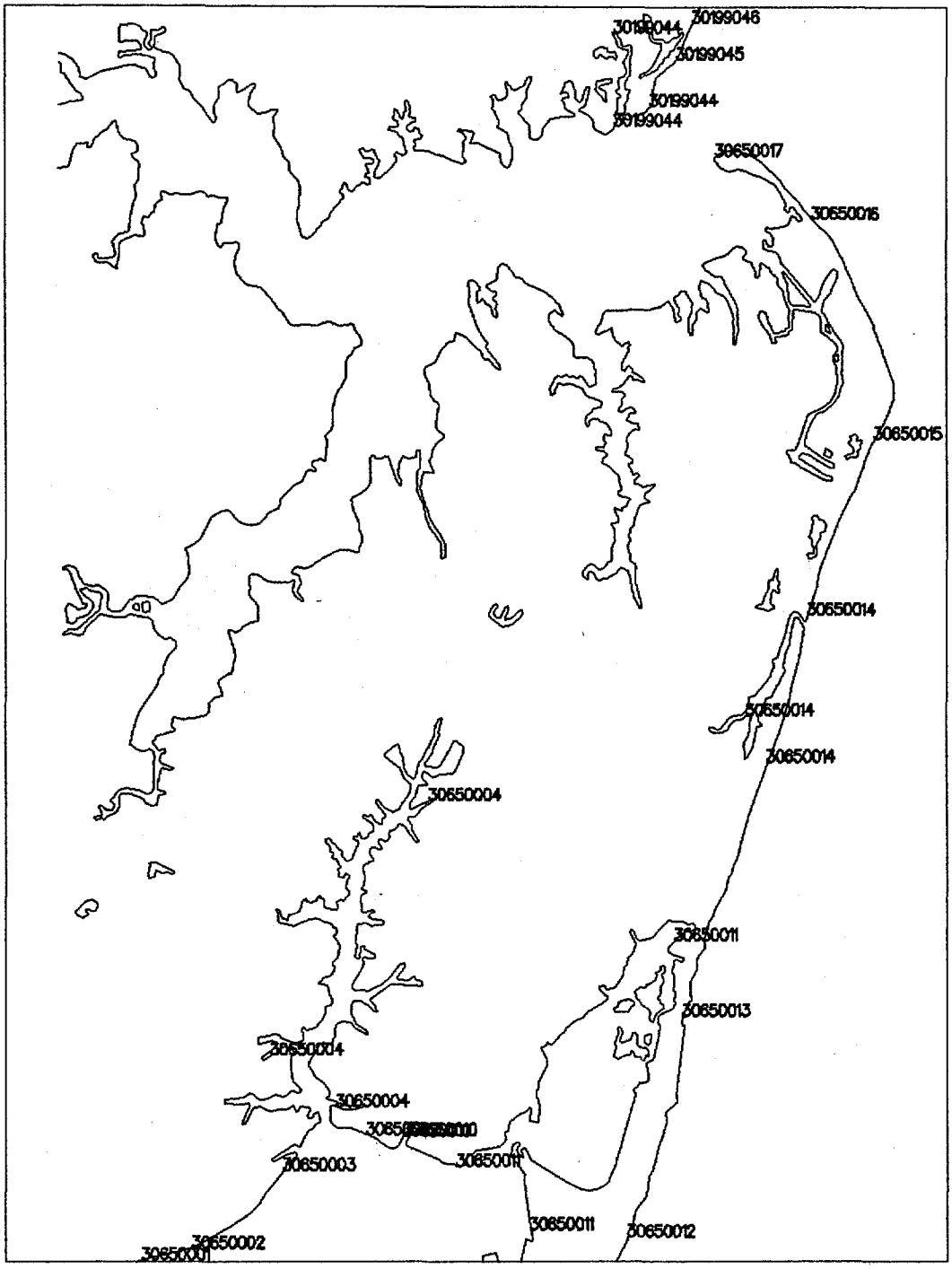
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
DUNNSVILLE QUAD



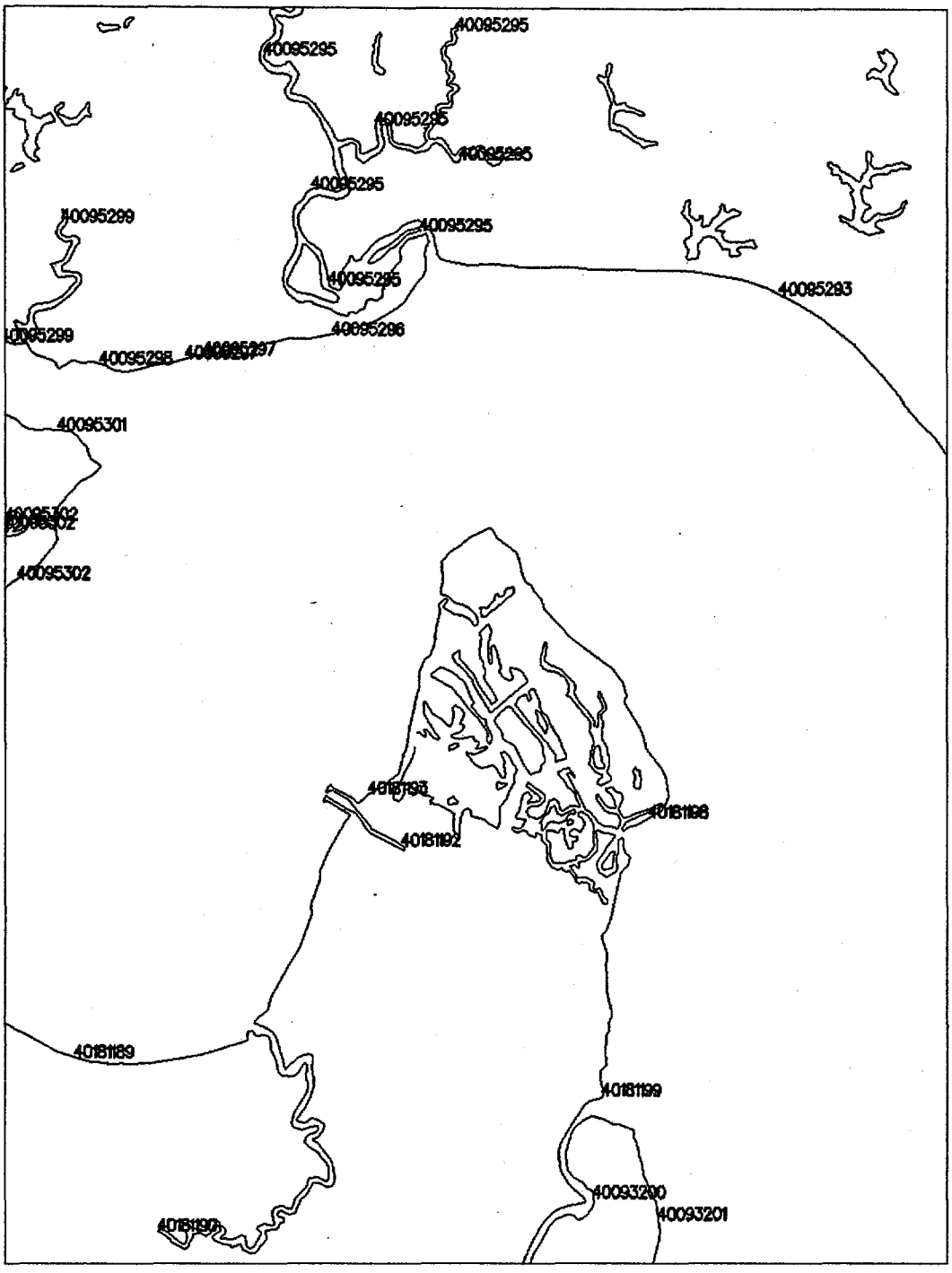
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
FRANKTOWN QUAD



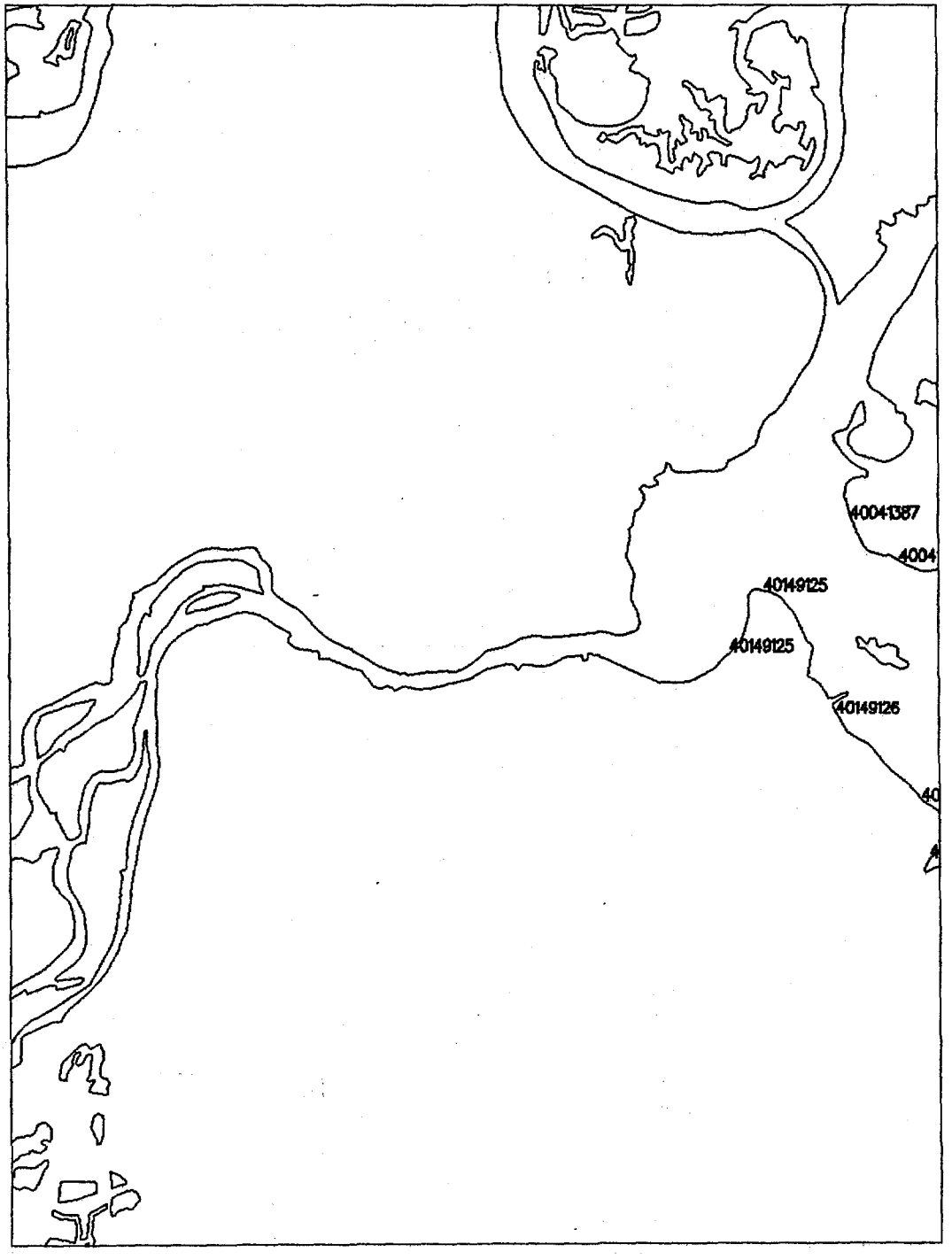
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
GREAT FOX ISLAND QUAD



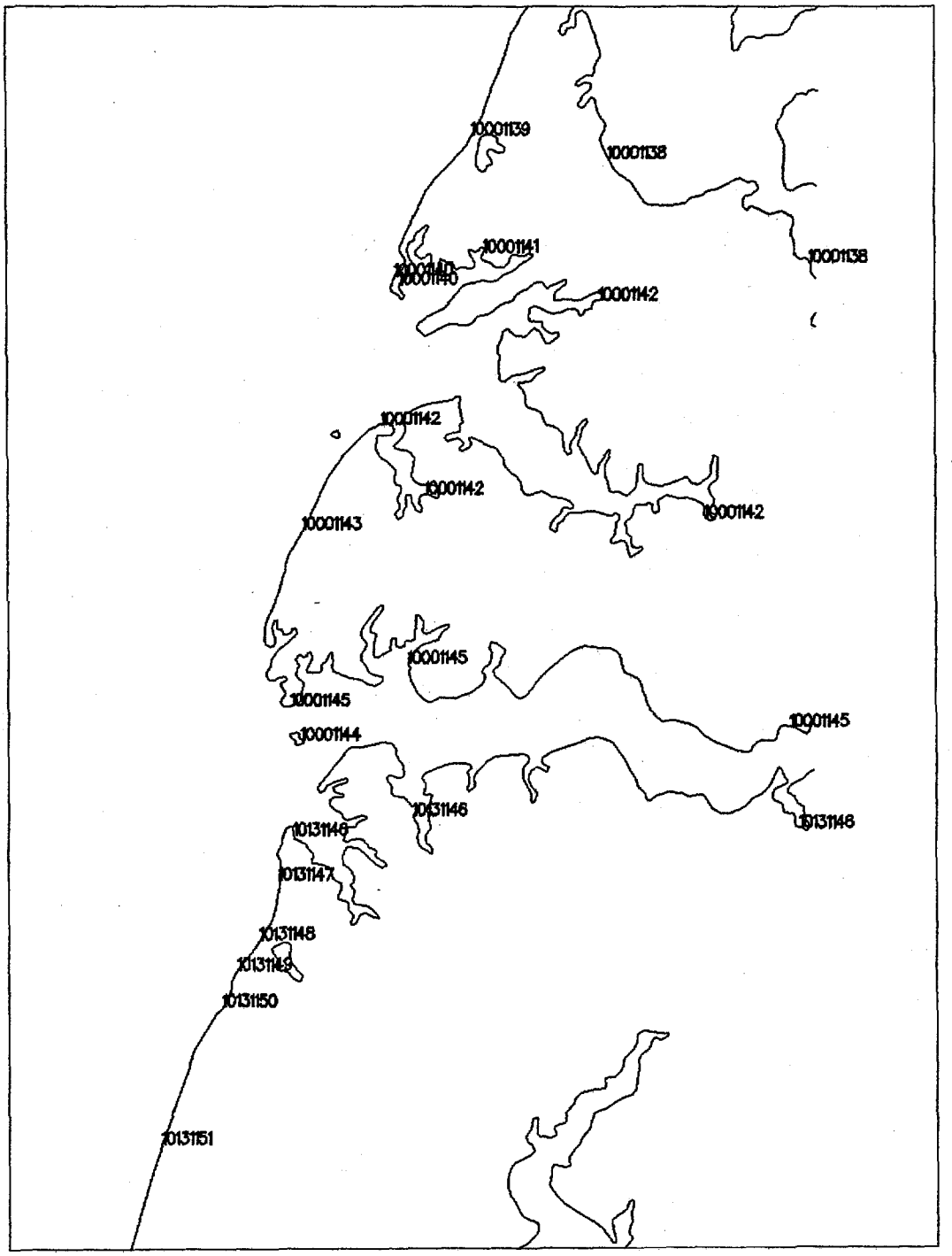
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
HAMPTON QUAD



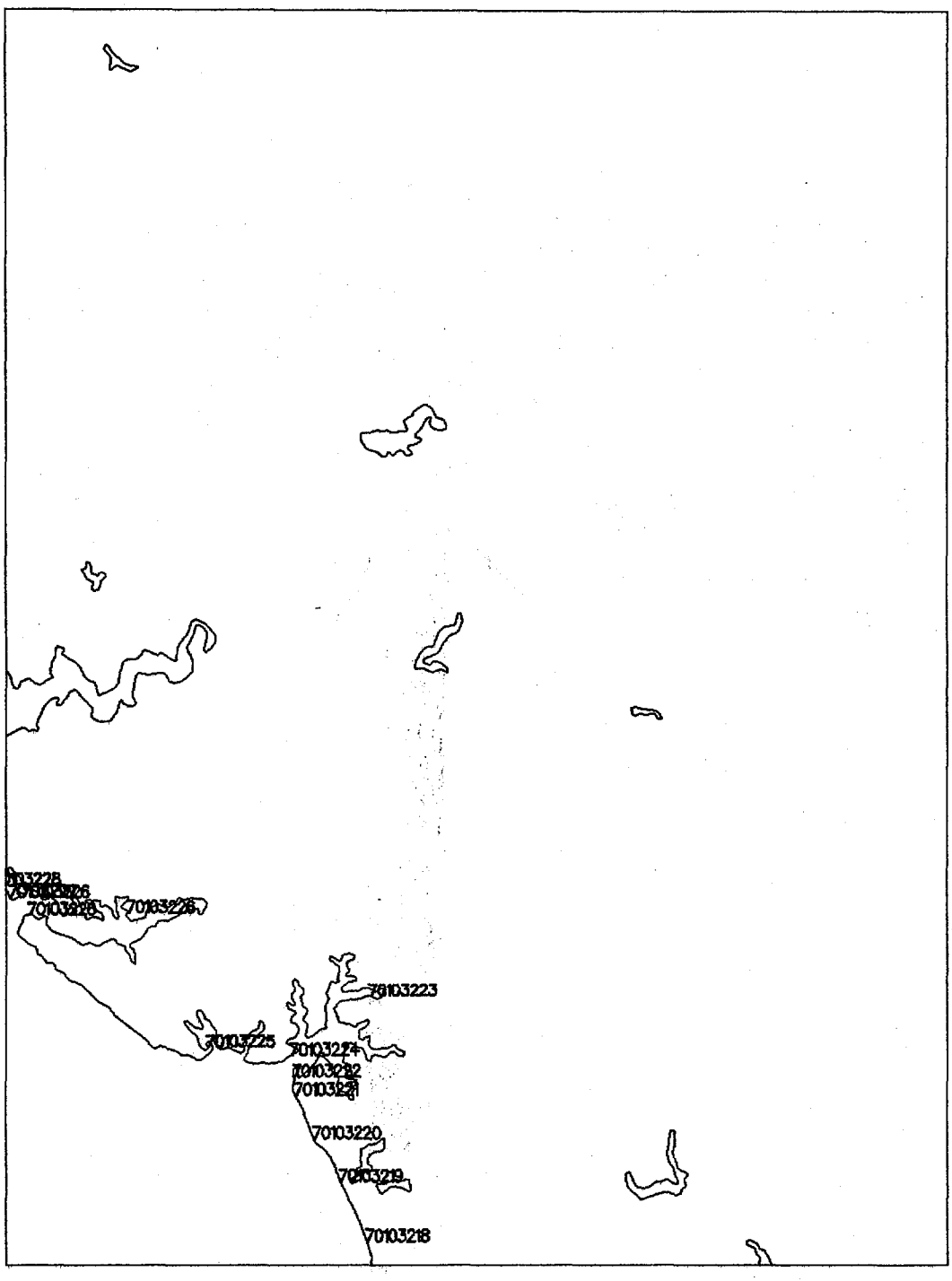
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
HOG ISLAND QUAD



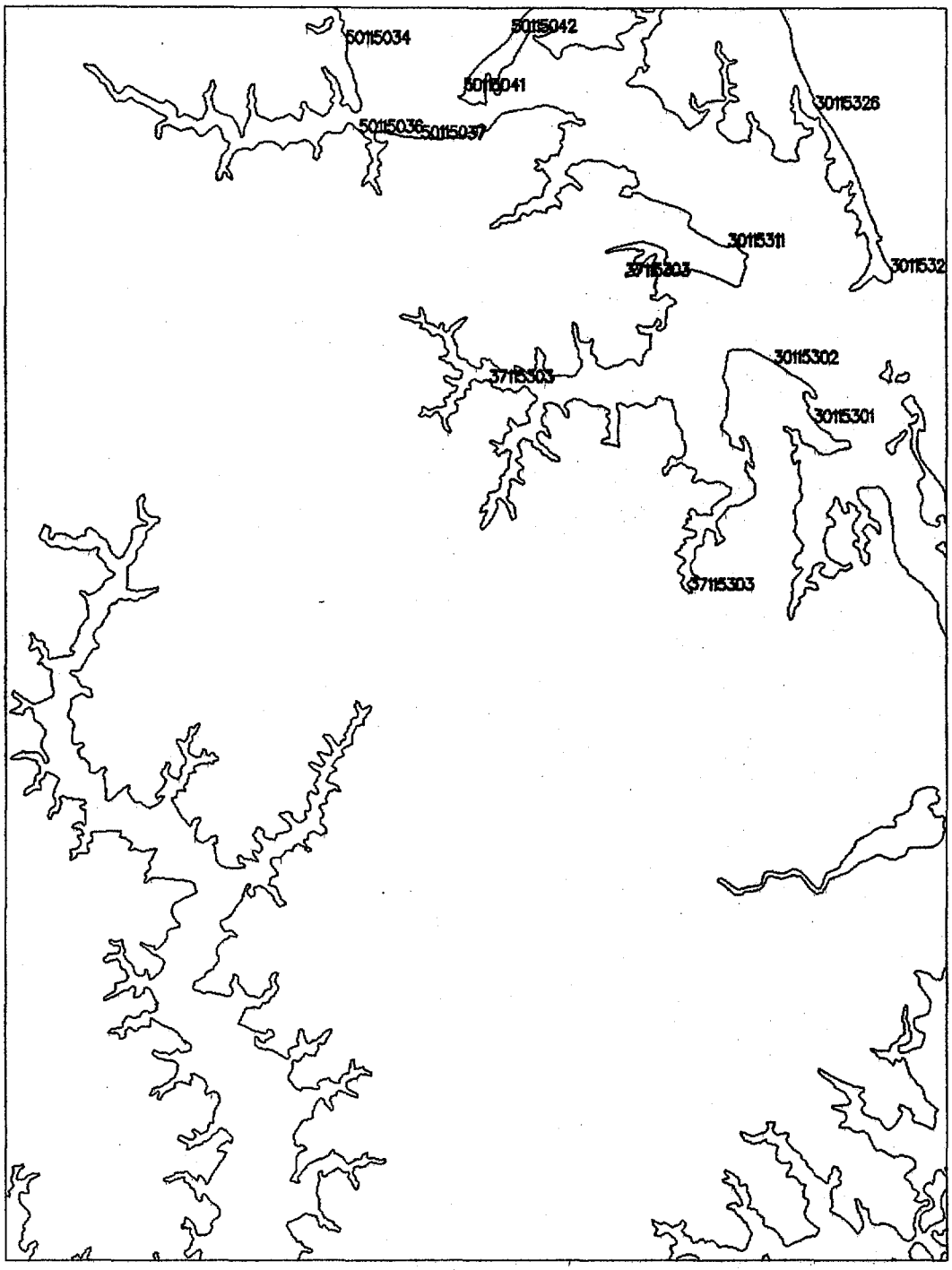
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
HOPEWELL QUAD



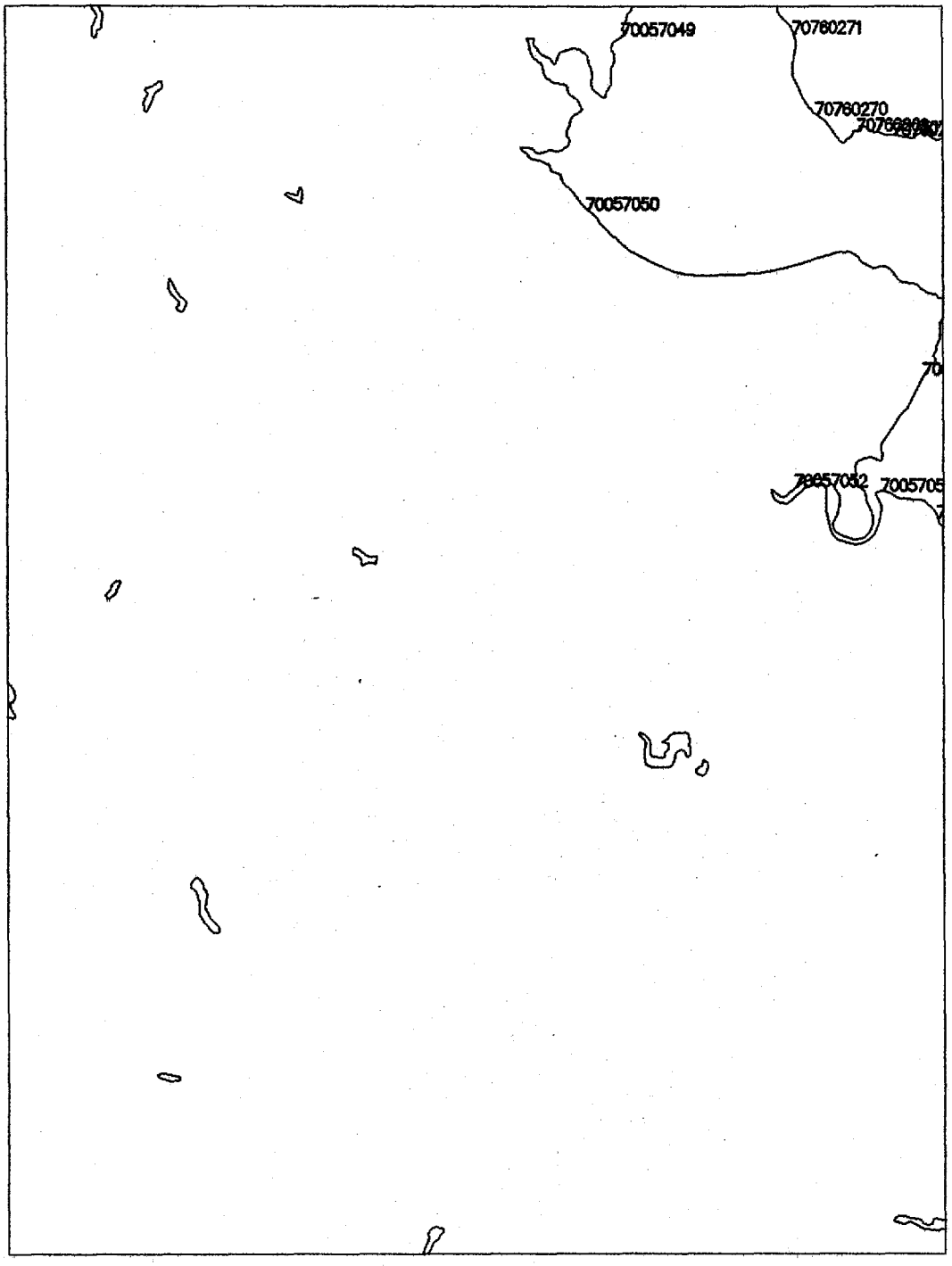
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
JAMESVILLE QUAD



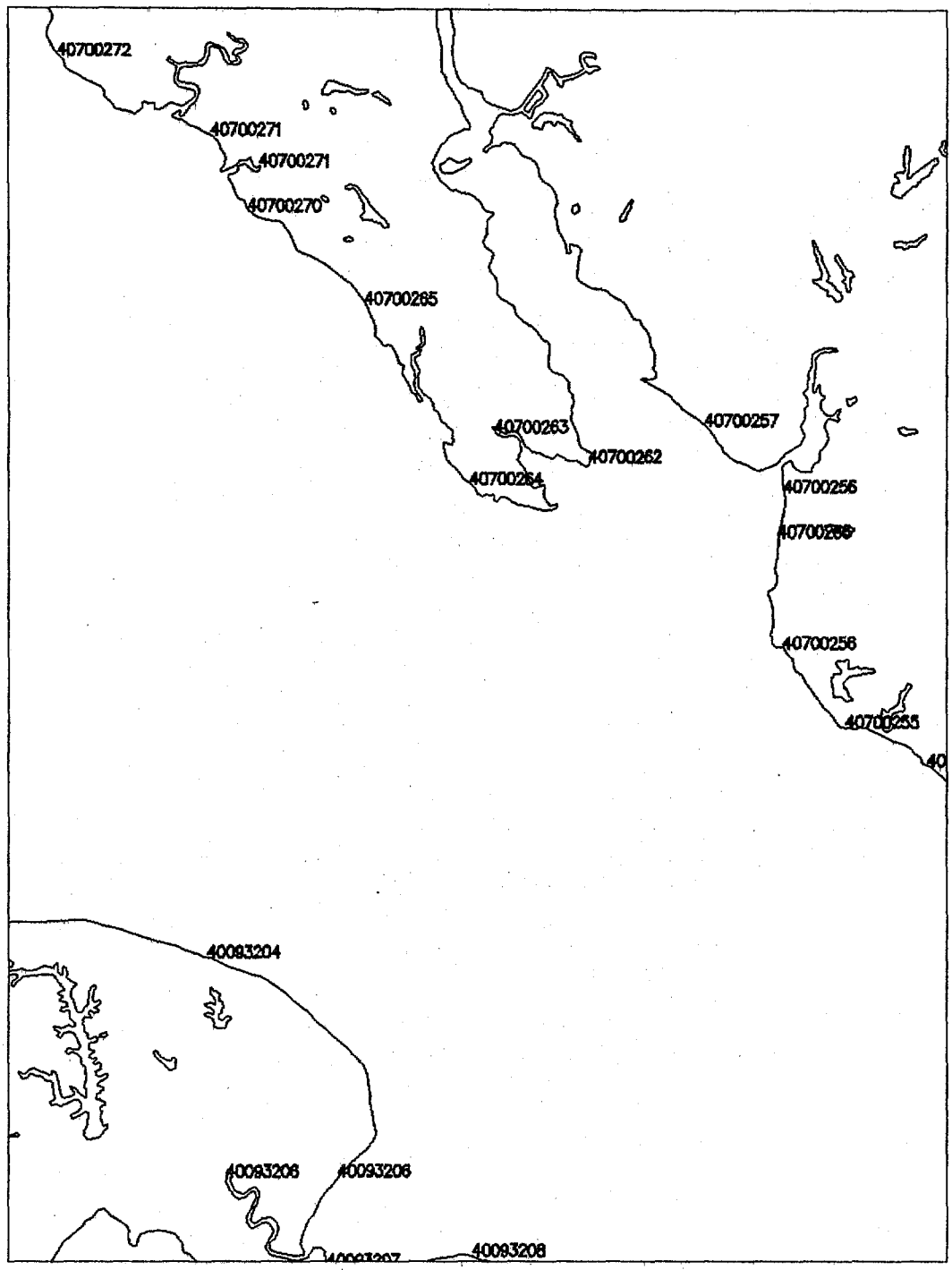
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
LIVELY QUAD



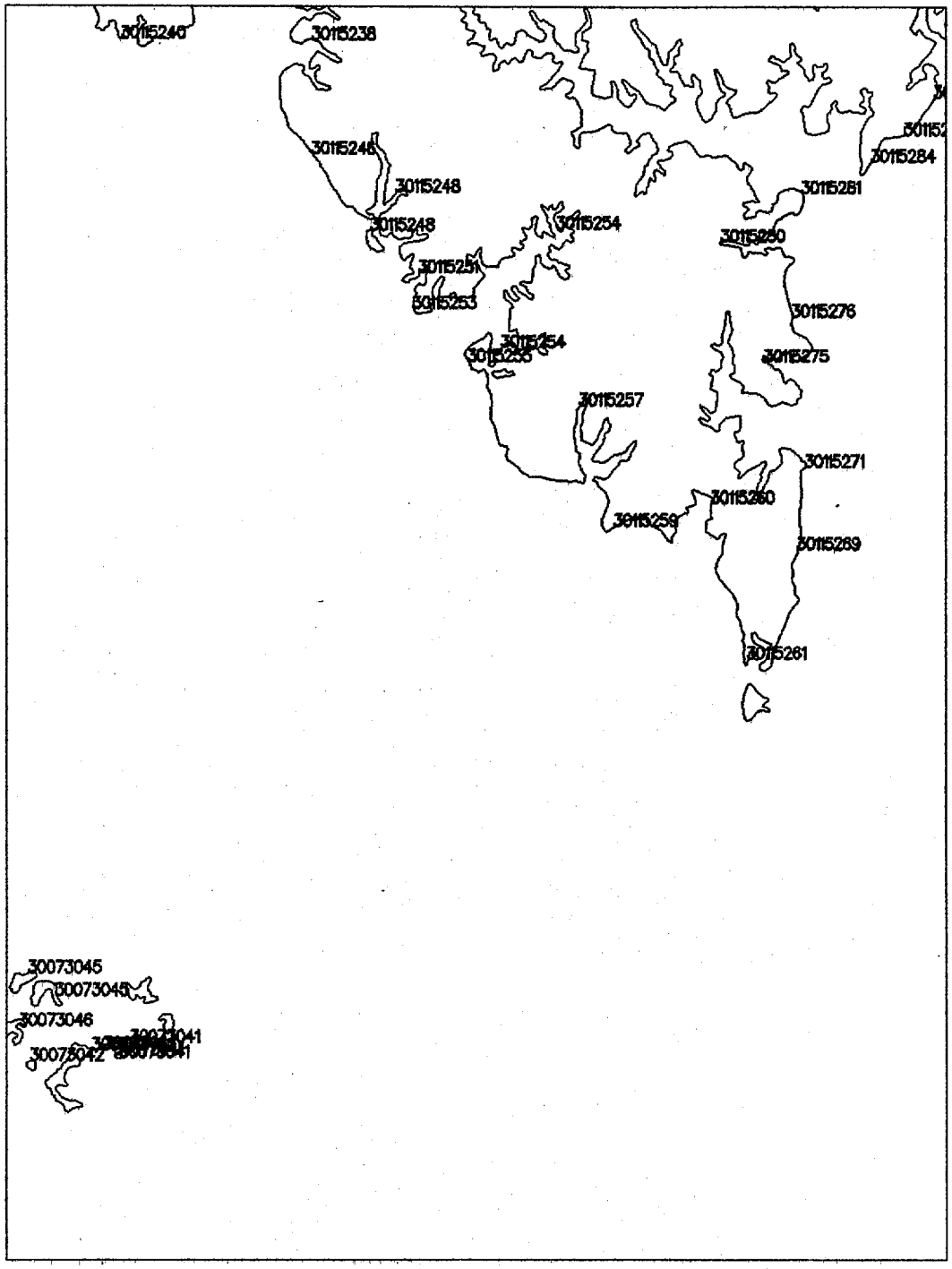
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
MATHEWS QUAD



VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
MOUNT LANDING QUAD



VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
MULBERRY ISLAND QUAD

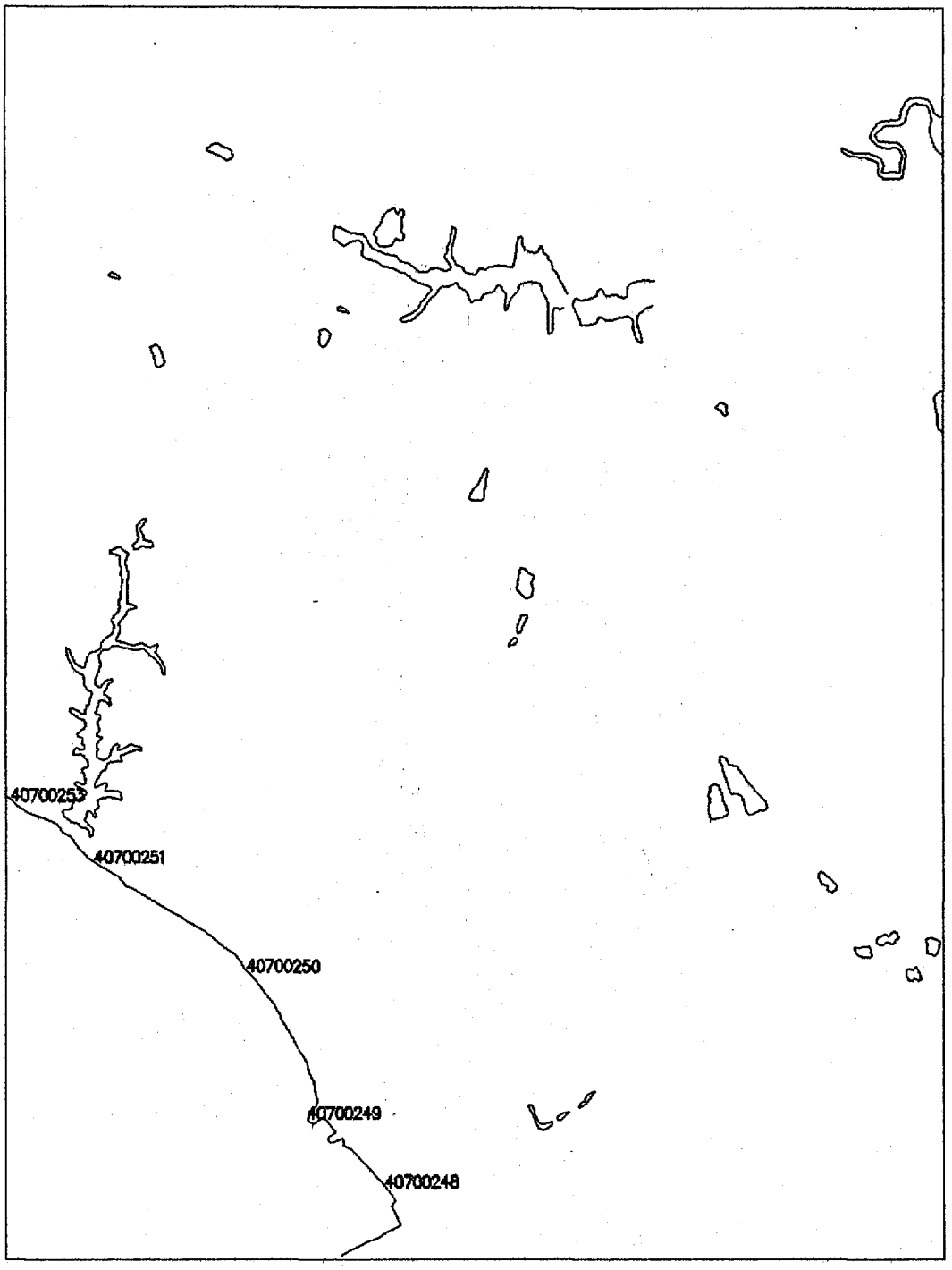


VIMS COASTAL INVENTORIES

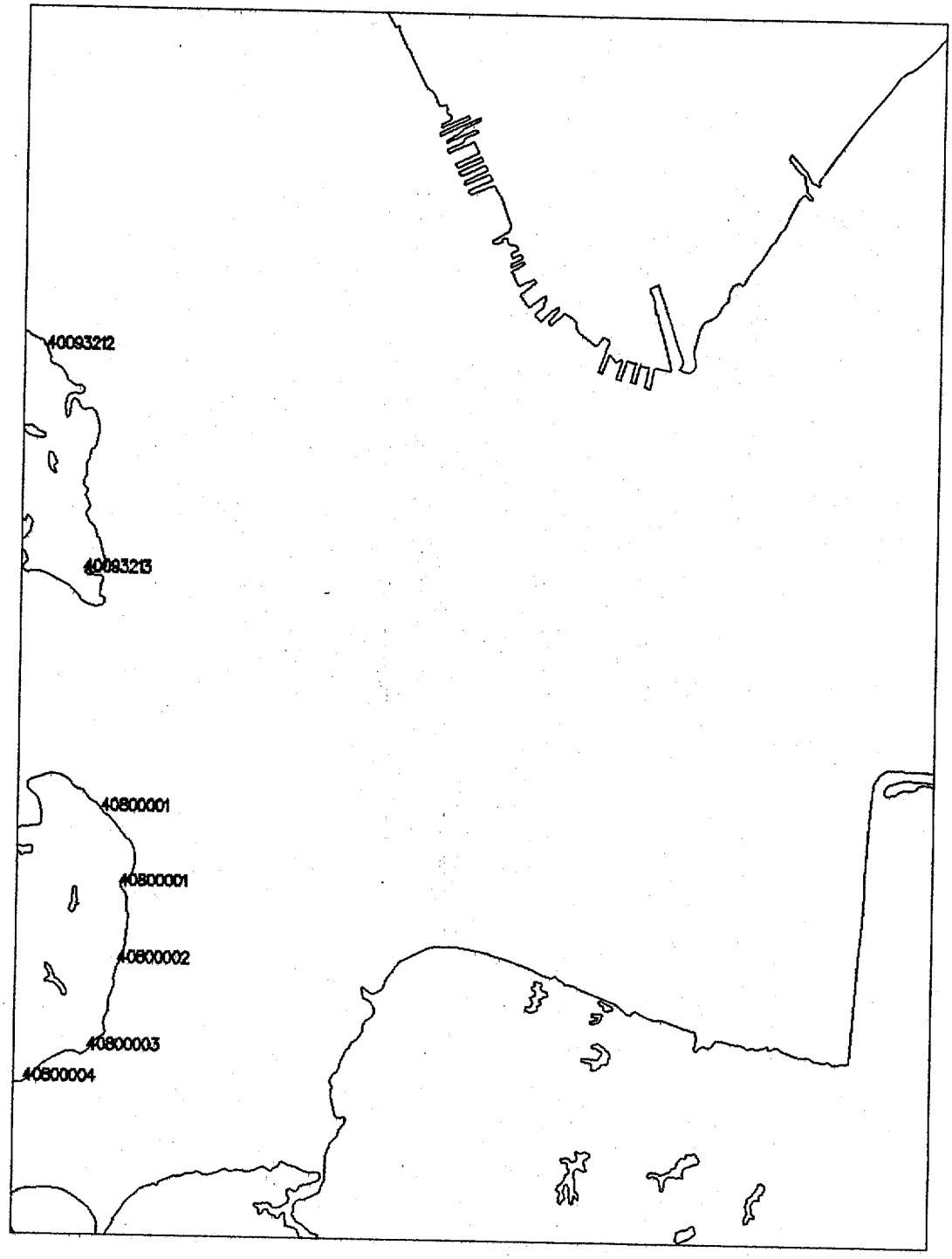
RIVER REACH INFORMATION

REACHCODES

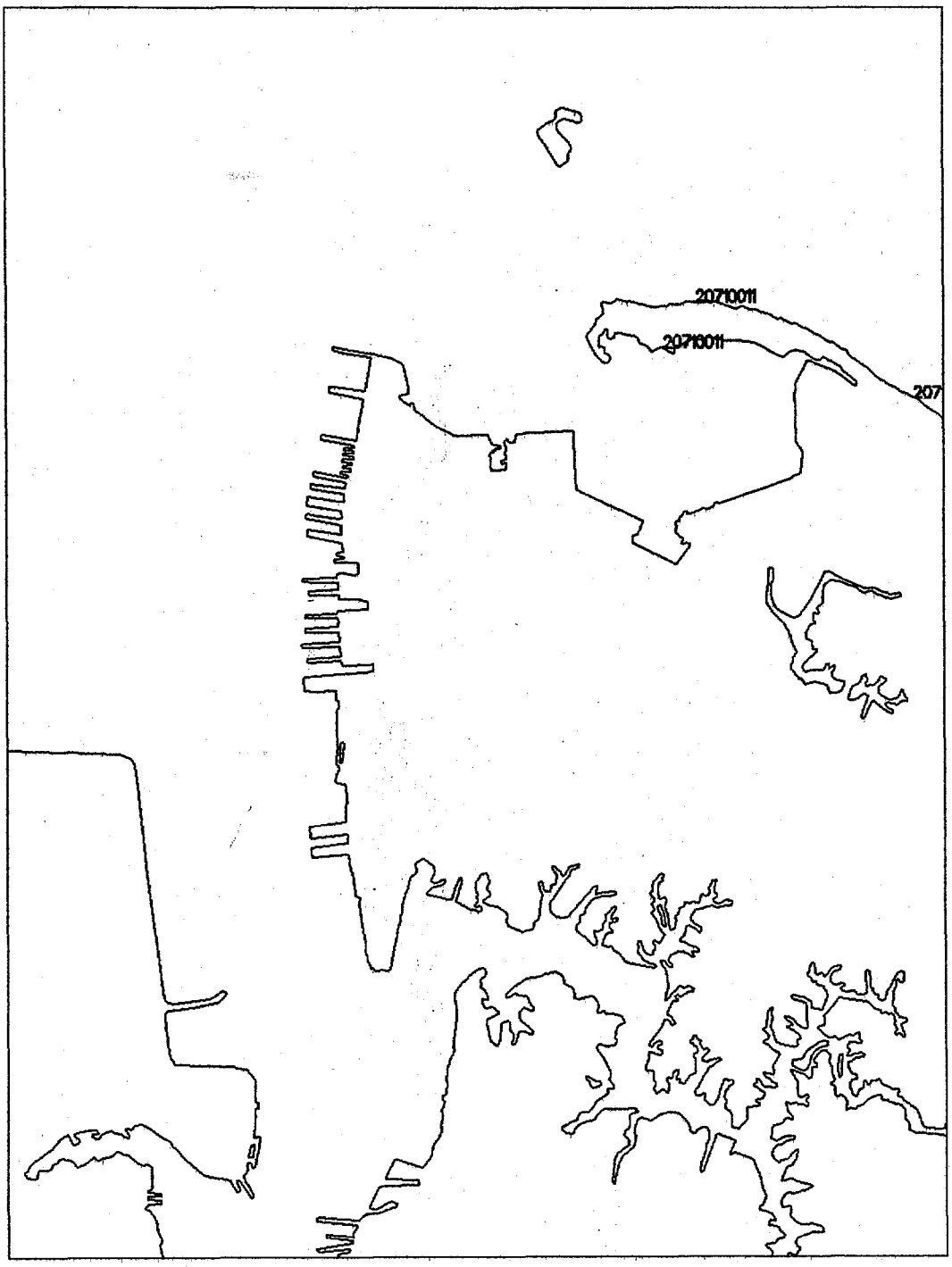
NEW POINT COMFORT QUAD



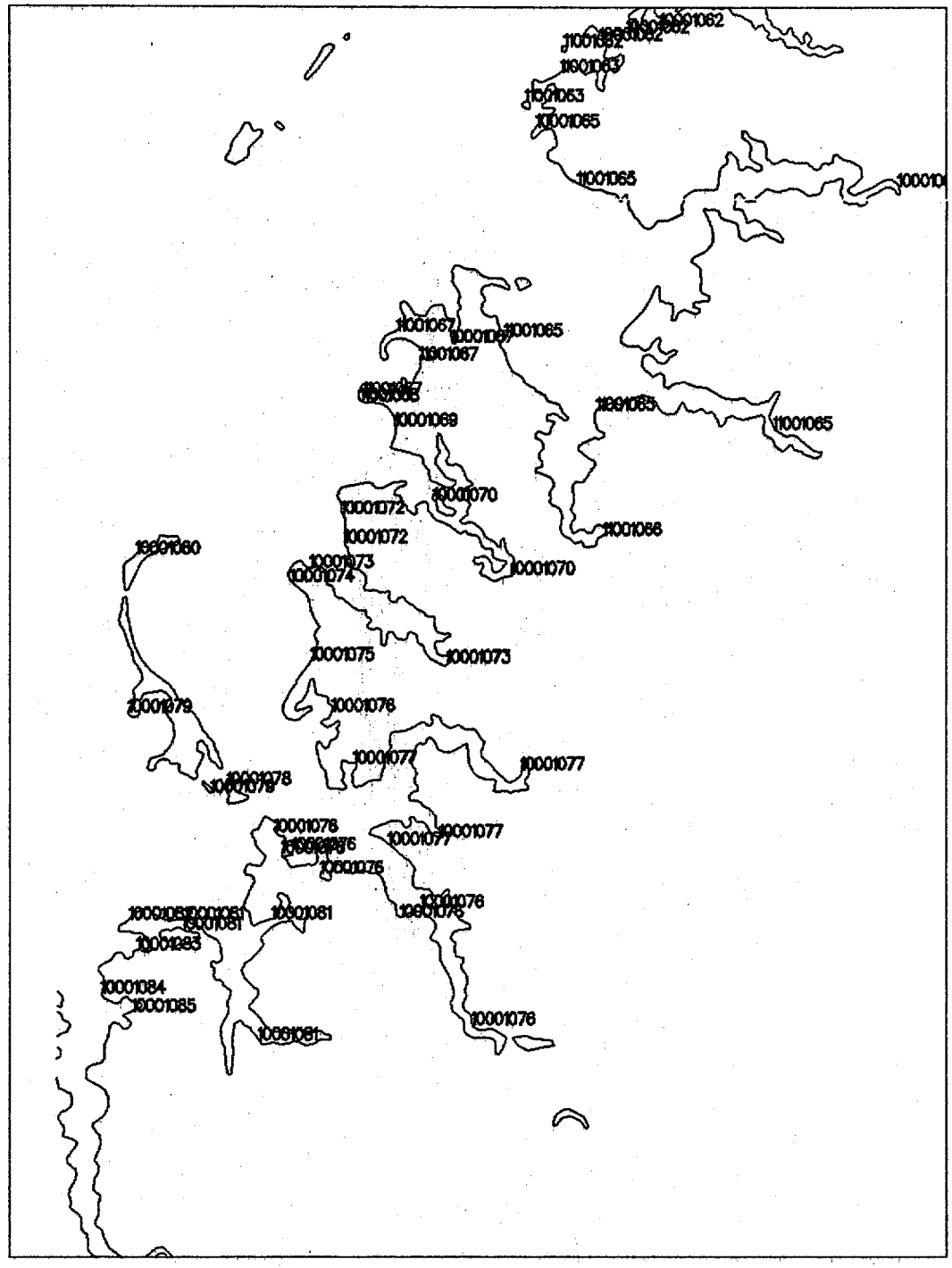
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
NEWPORT NEWS NORTH QUAD



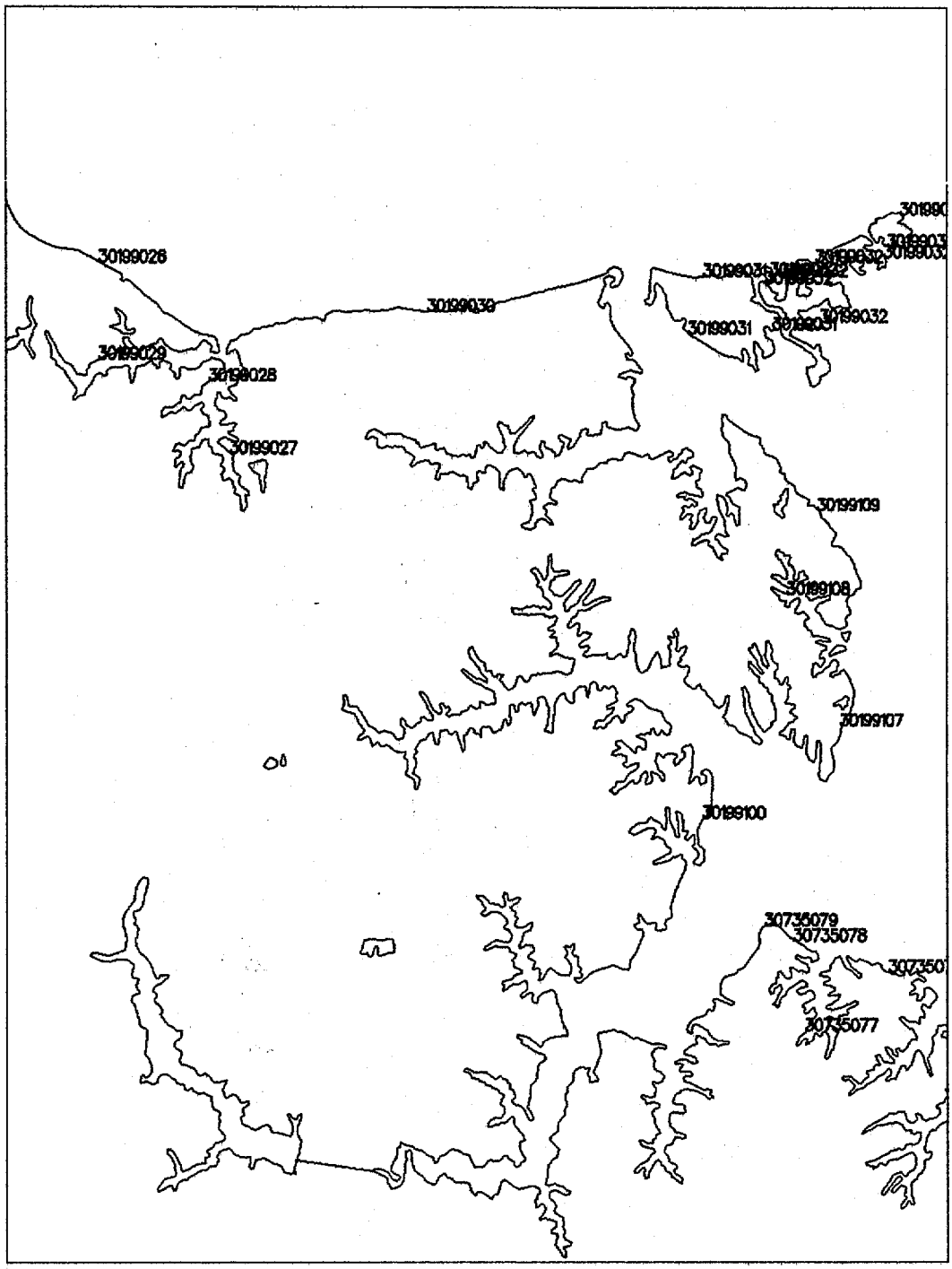
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
NEWPORT NEWS SOUTH QUAD



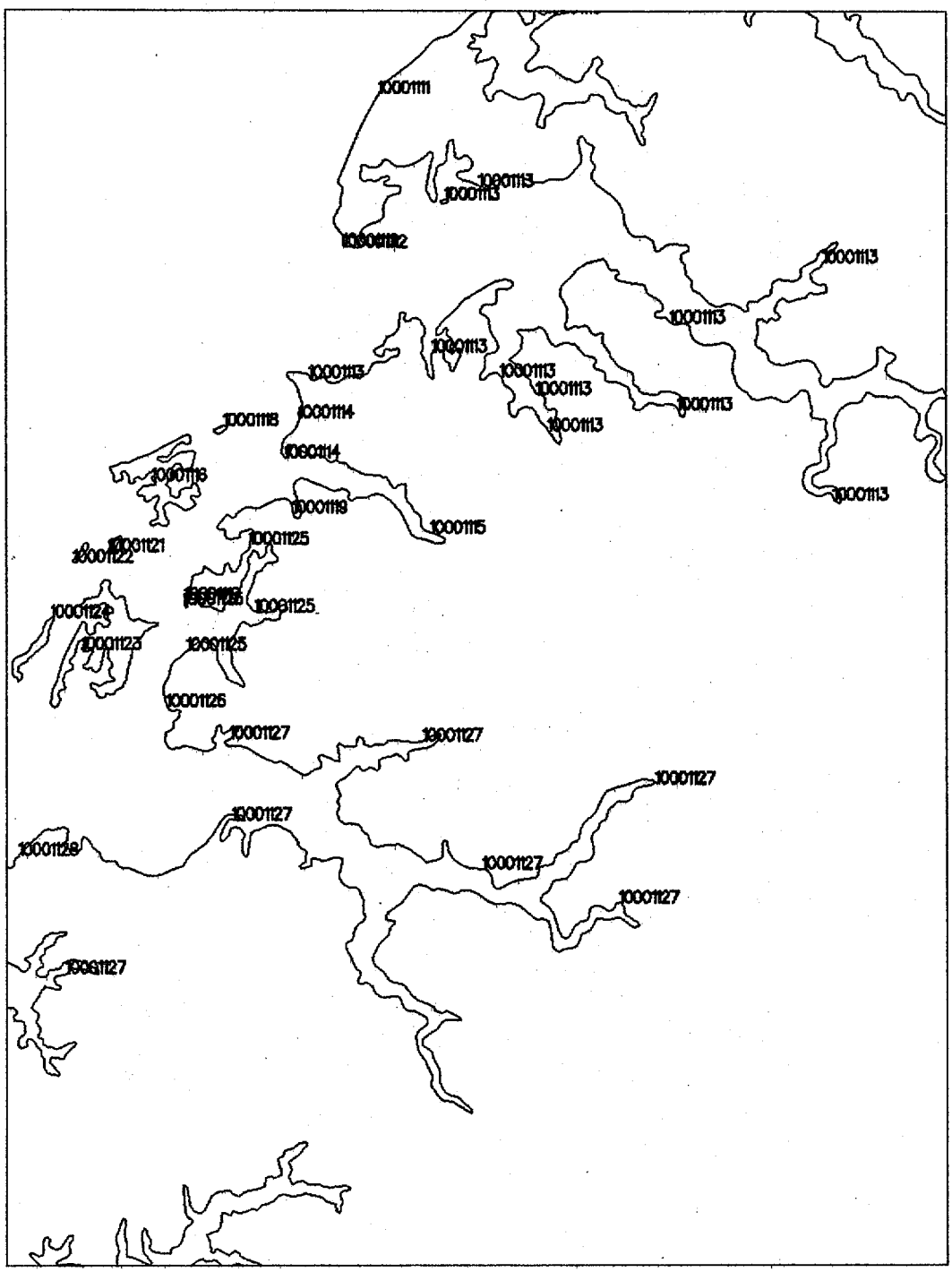
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
NORFOLK NORTH QUAD



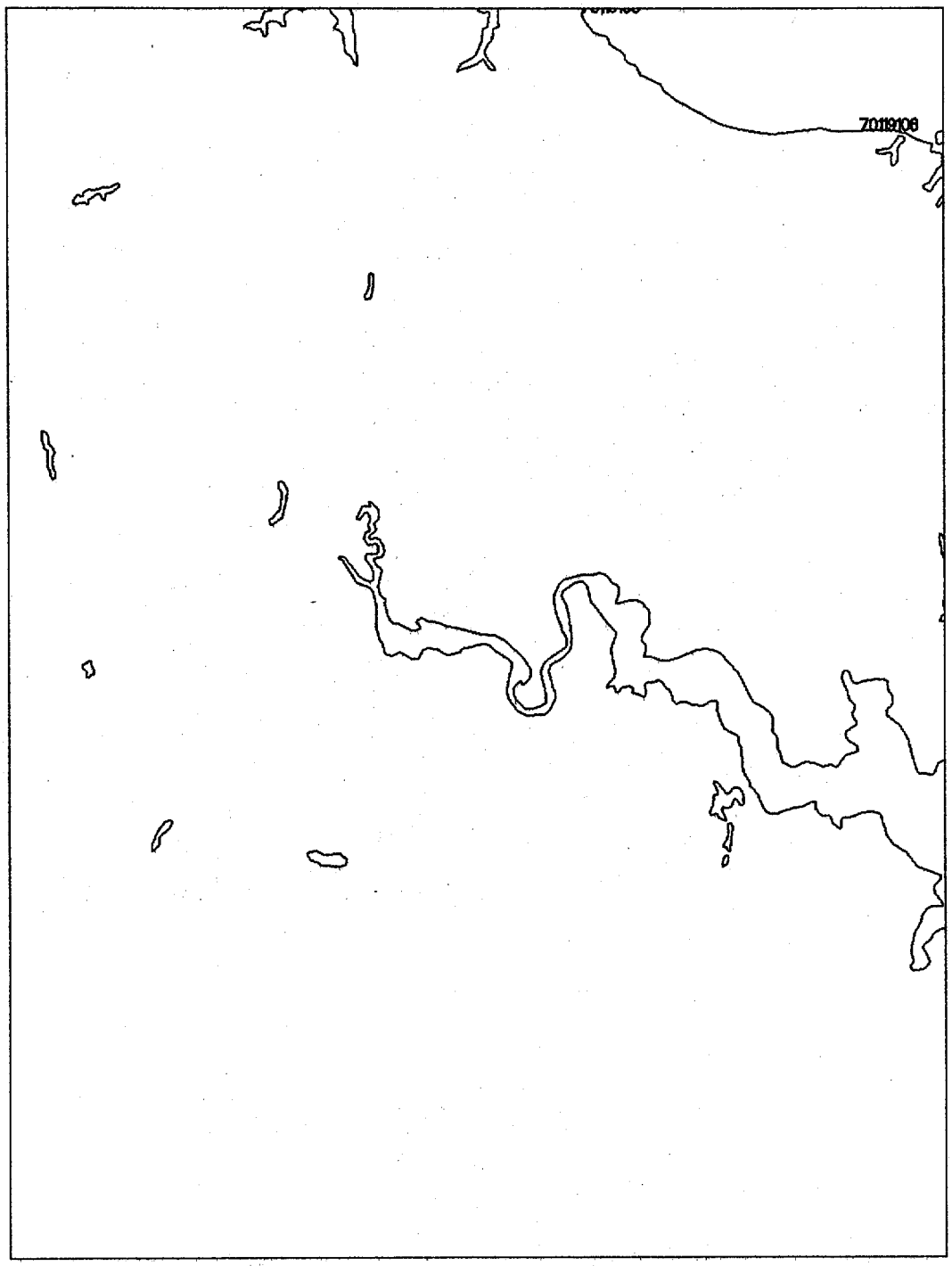
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
PARKSLEY QUAD



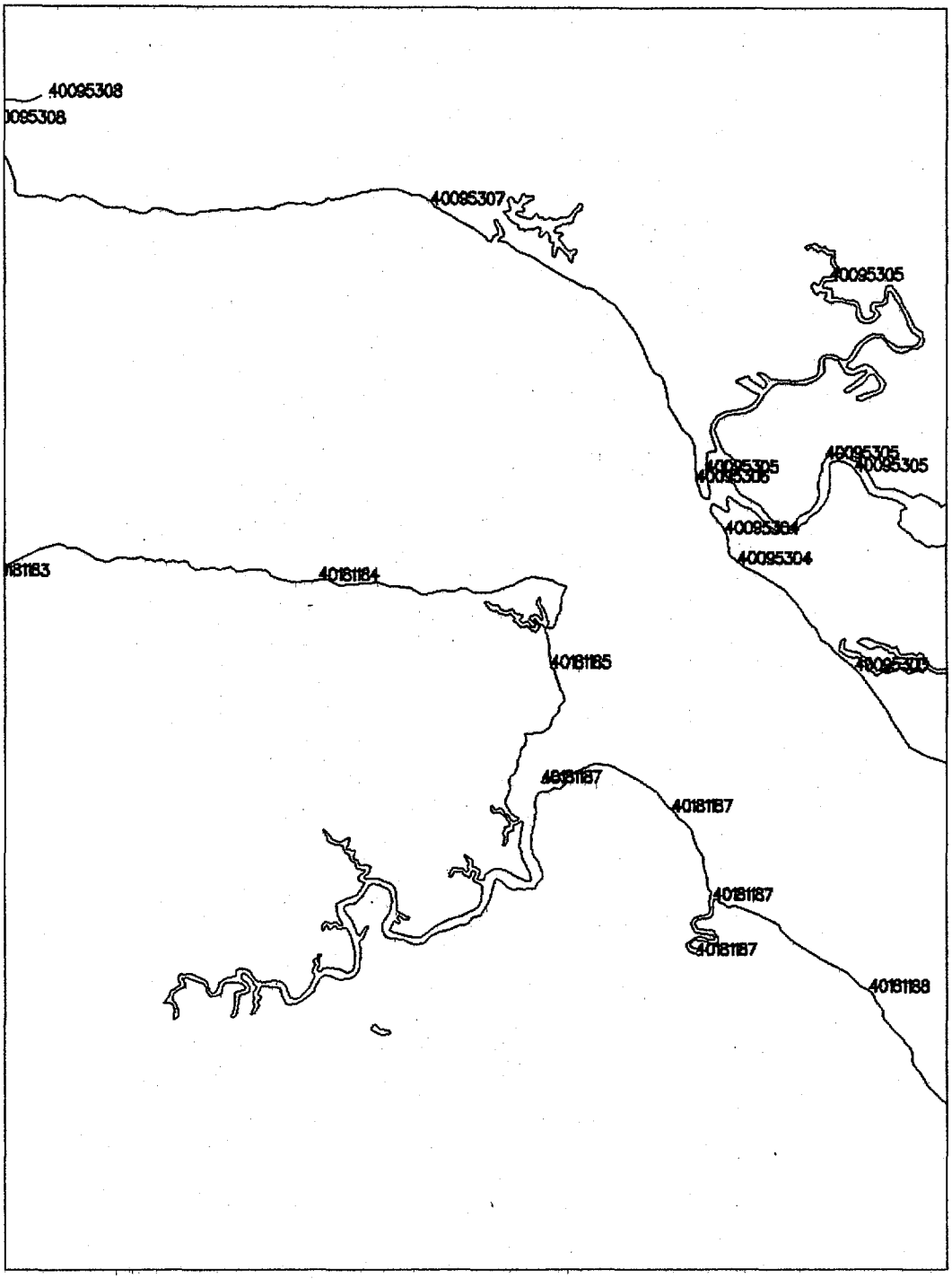
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
POQUOSON WEST QUAD



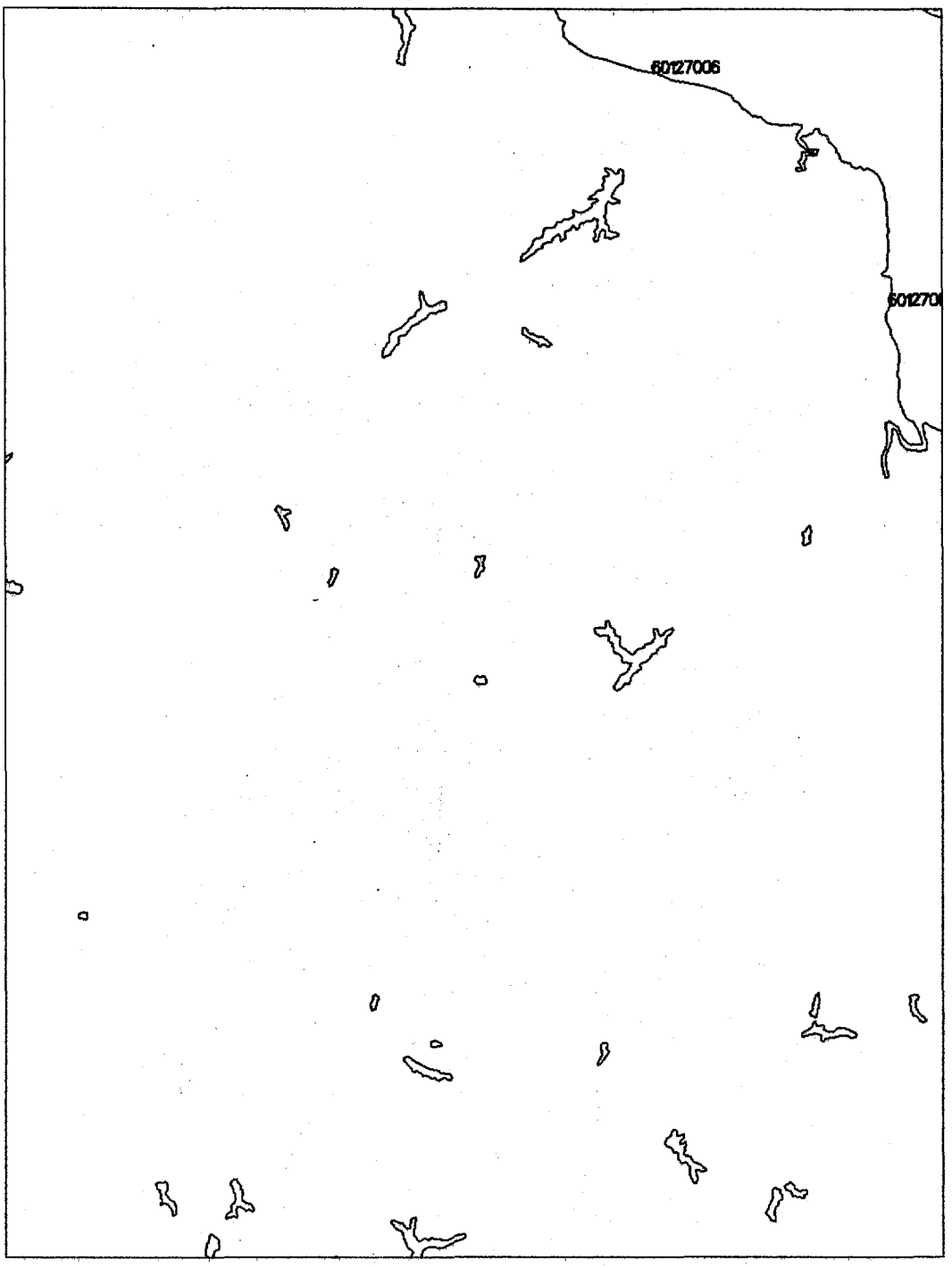
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
PUNGOTEAGUE QUAD



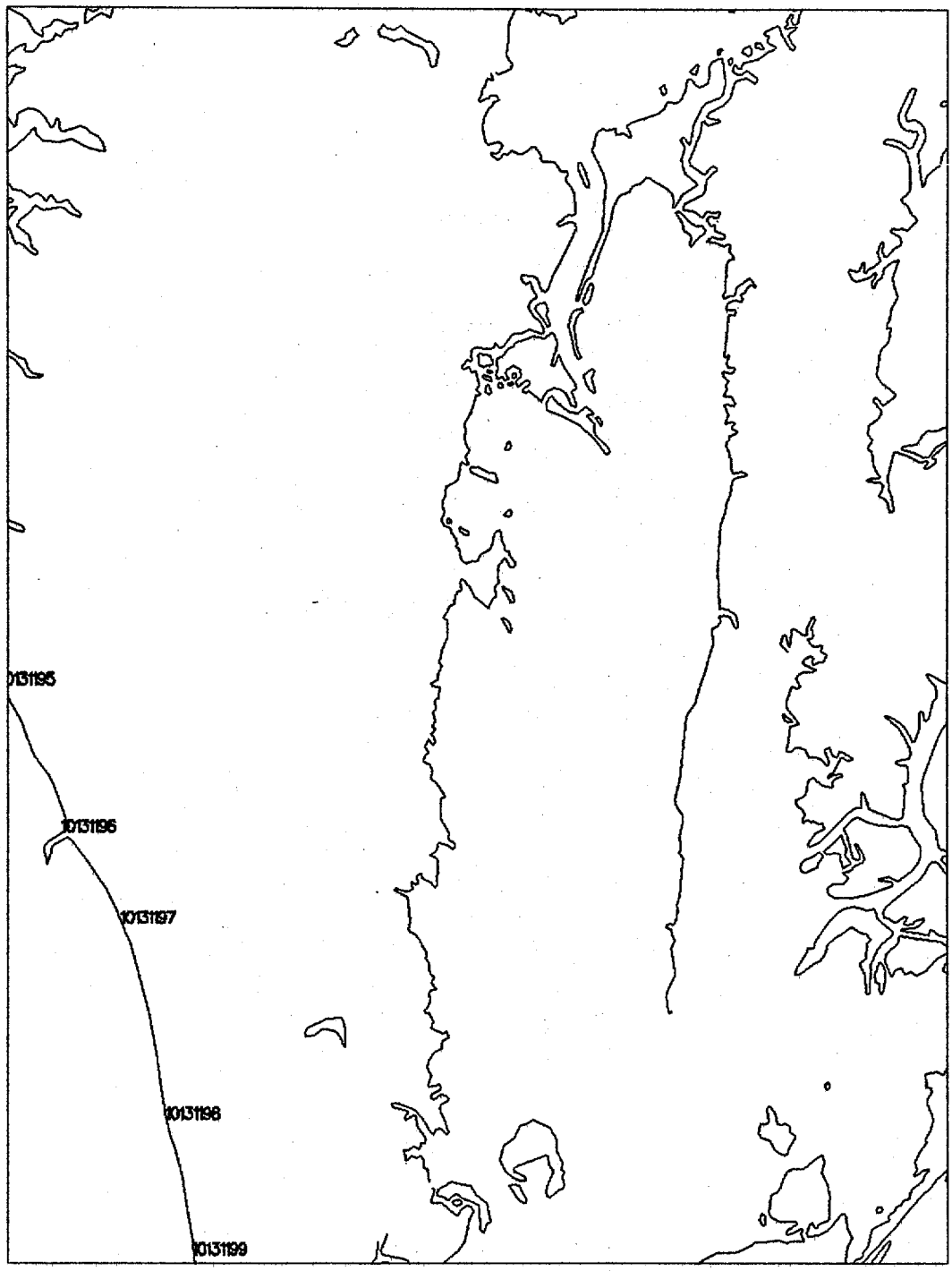
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
SALUDA QUAD



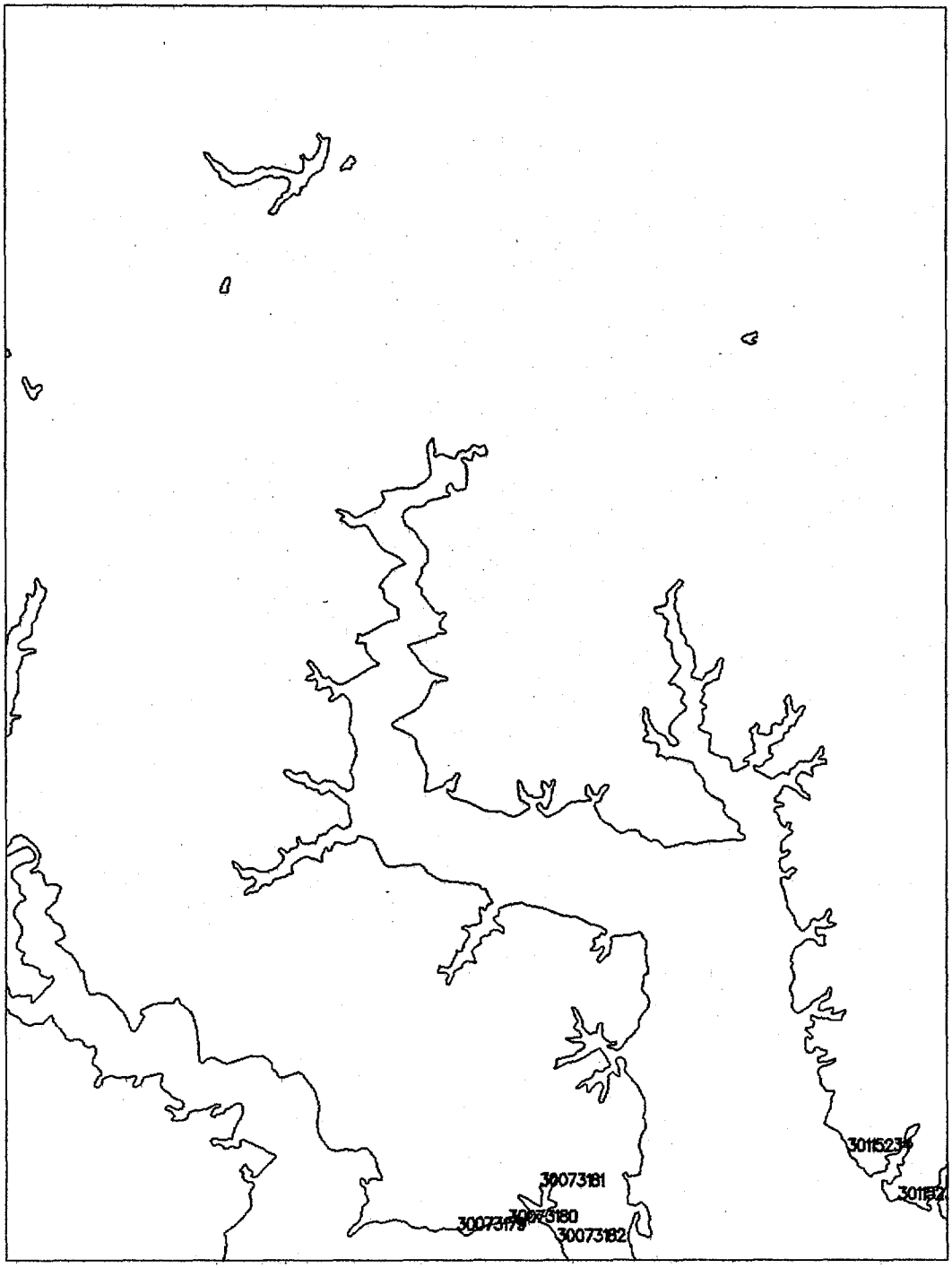
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
SURRY QUAD



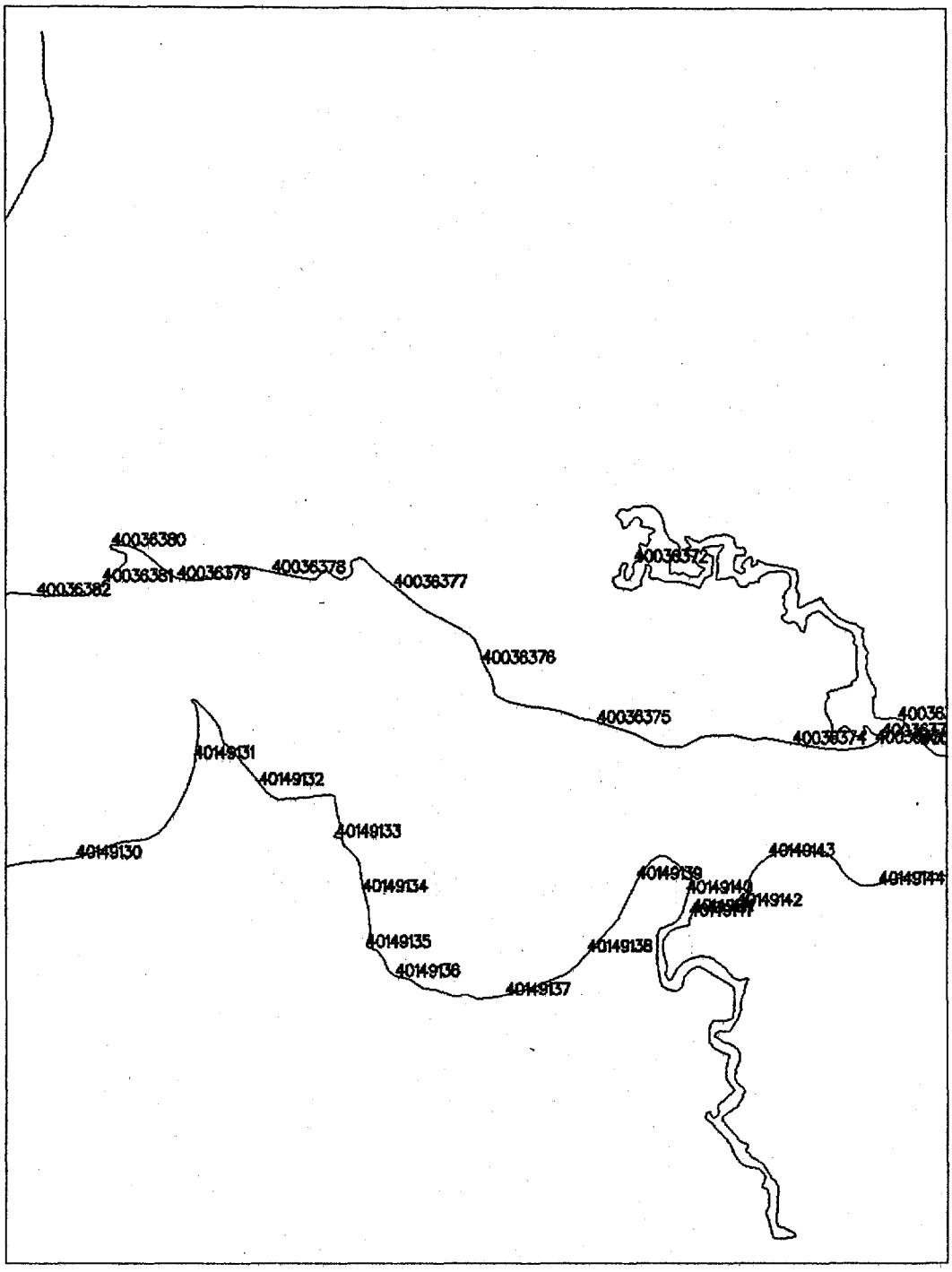
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
TOANO QUAD



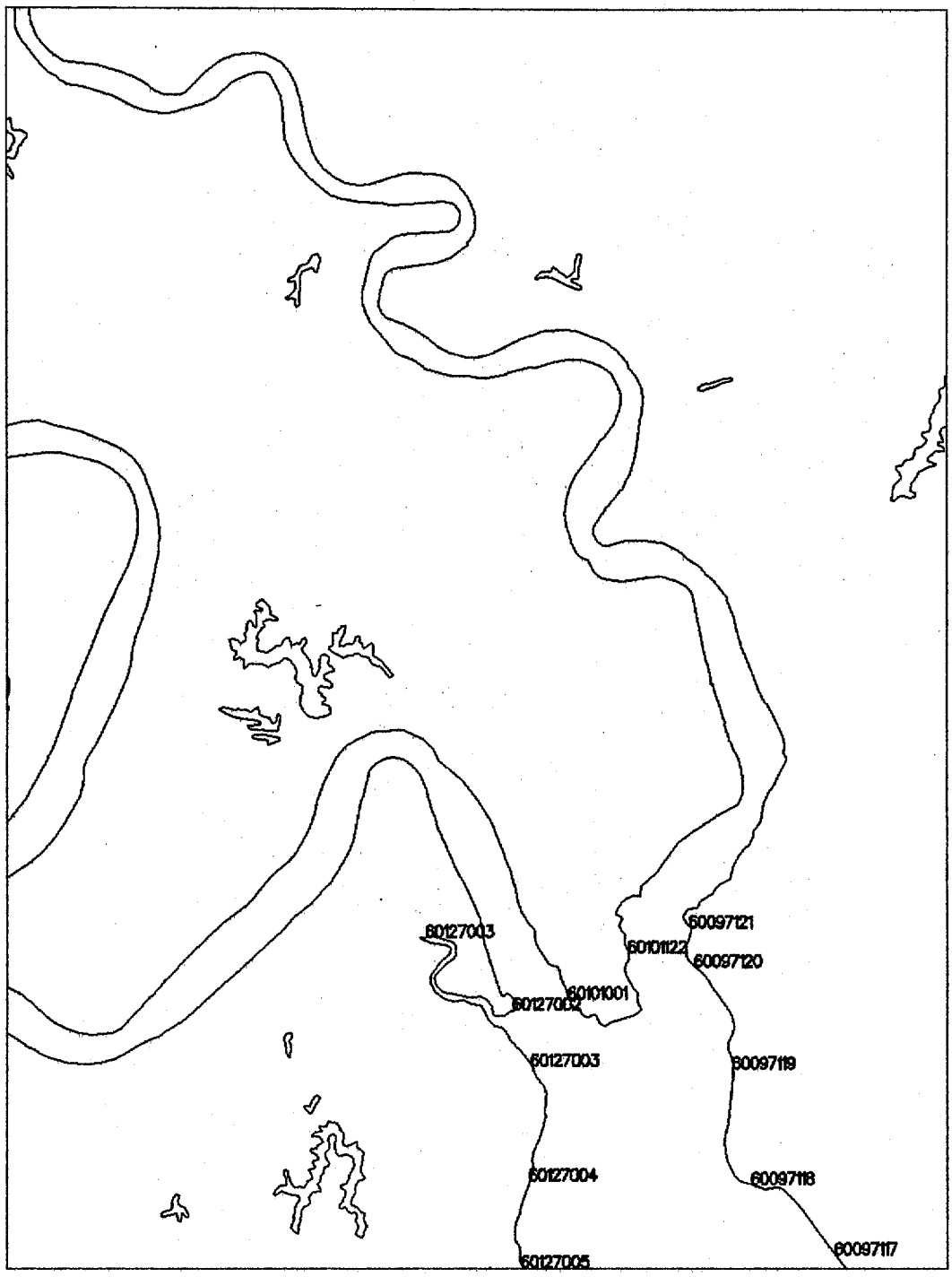
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
TOWNSEND QUAD



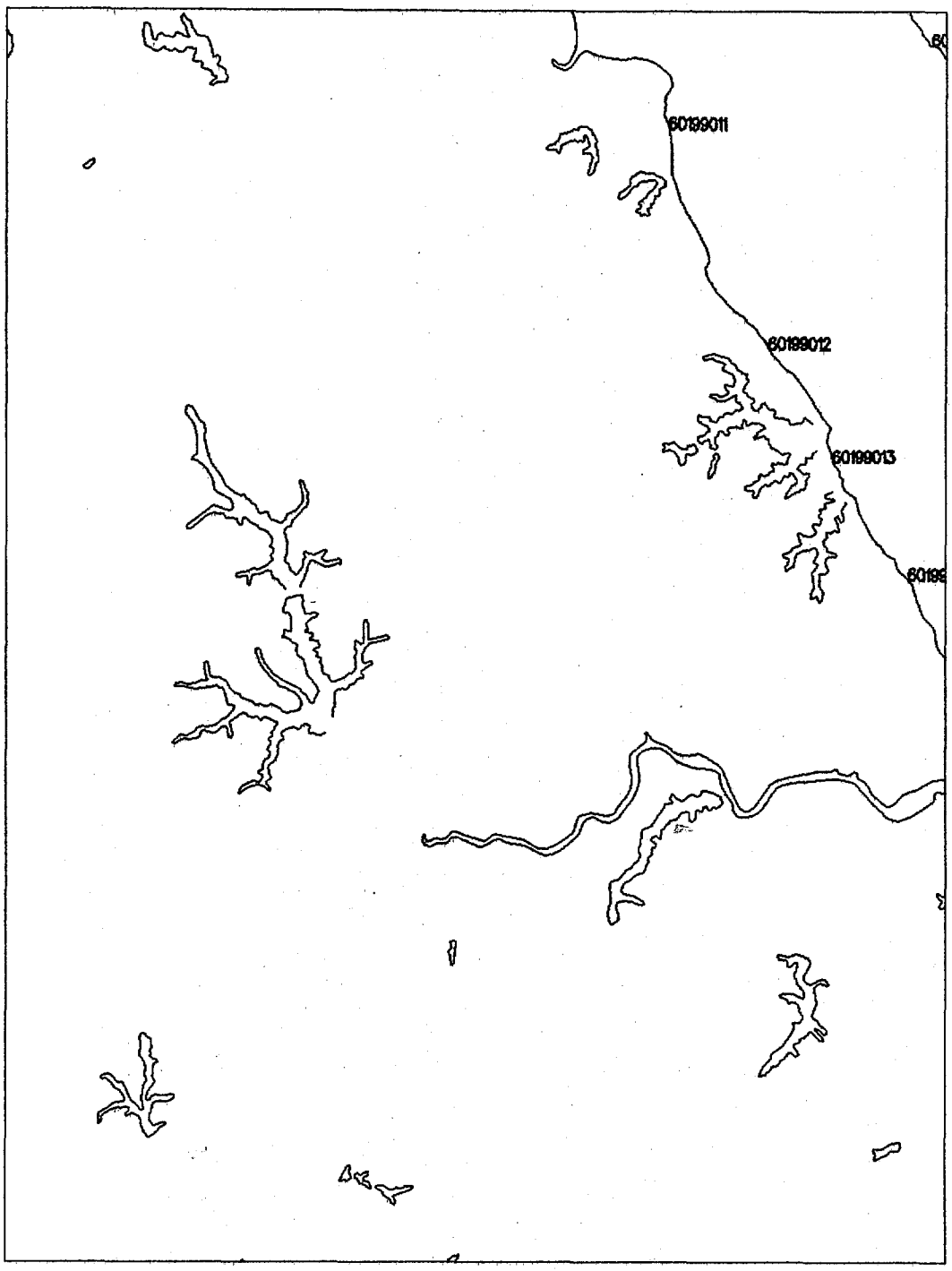
VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
WARE NECK QUAD



VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
WESTOVER QUAD



VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
WEST POINT QUAD



VIMS COASTAL INVENTORIES
RIVER REACH INFORMATION
REACHCODES
WILLIAMSBURG QUAD

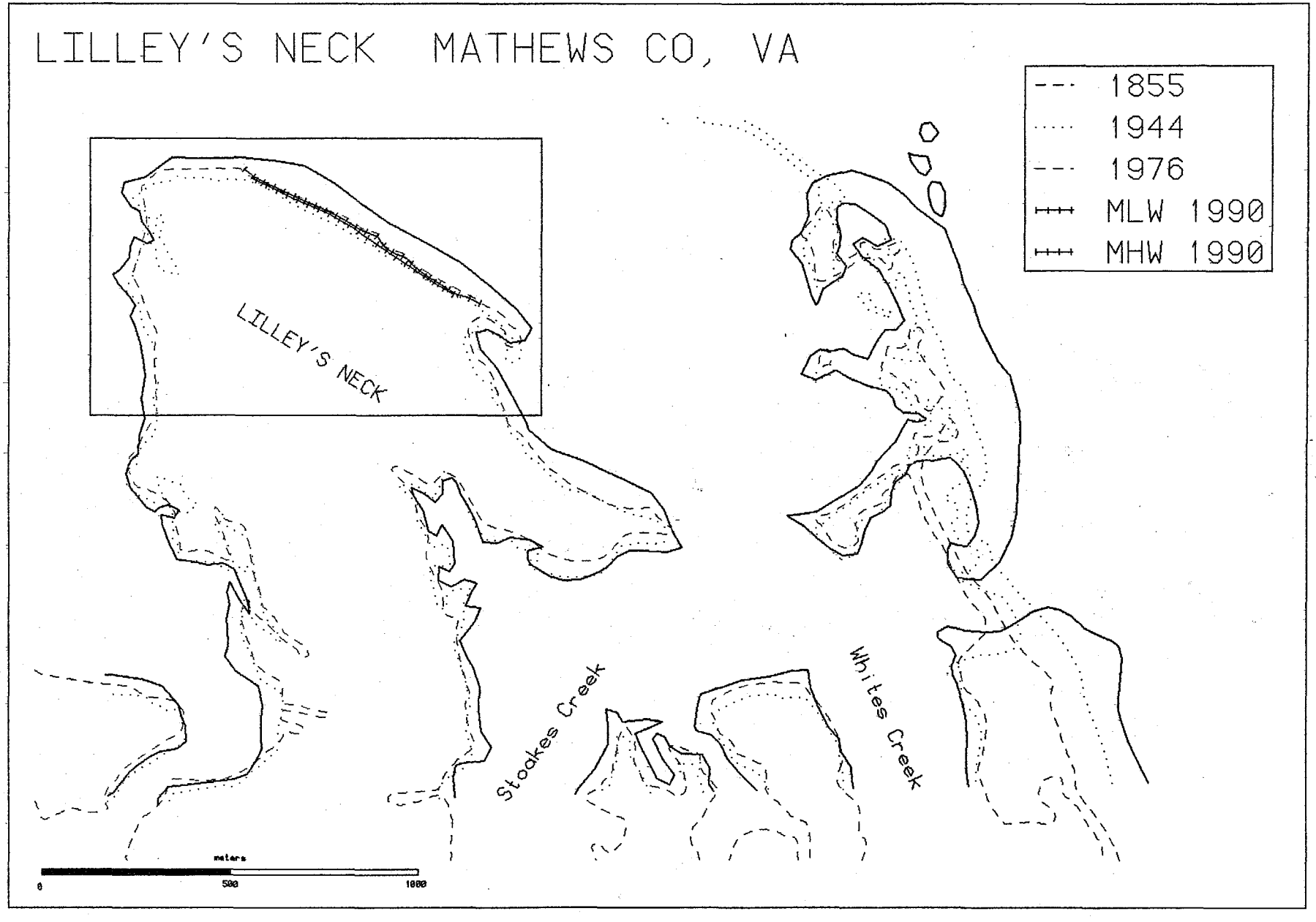
CHAPTER XIV. PROCEDURE FOR ANALYZING HISTORICAL CHANGE IN SHORELINE POSITION

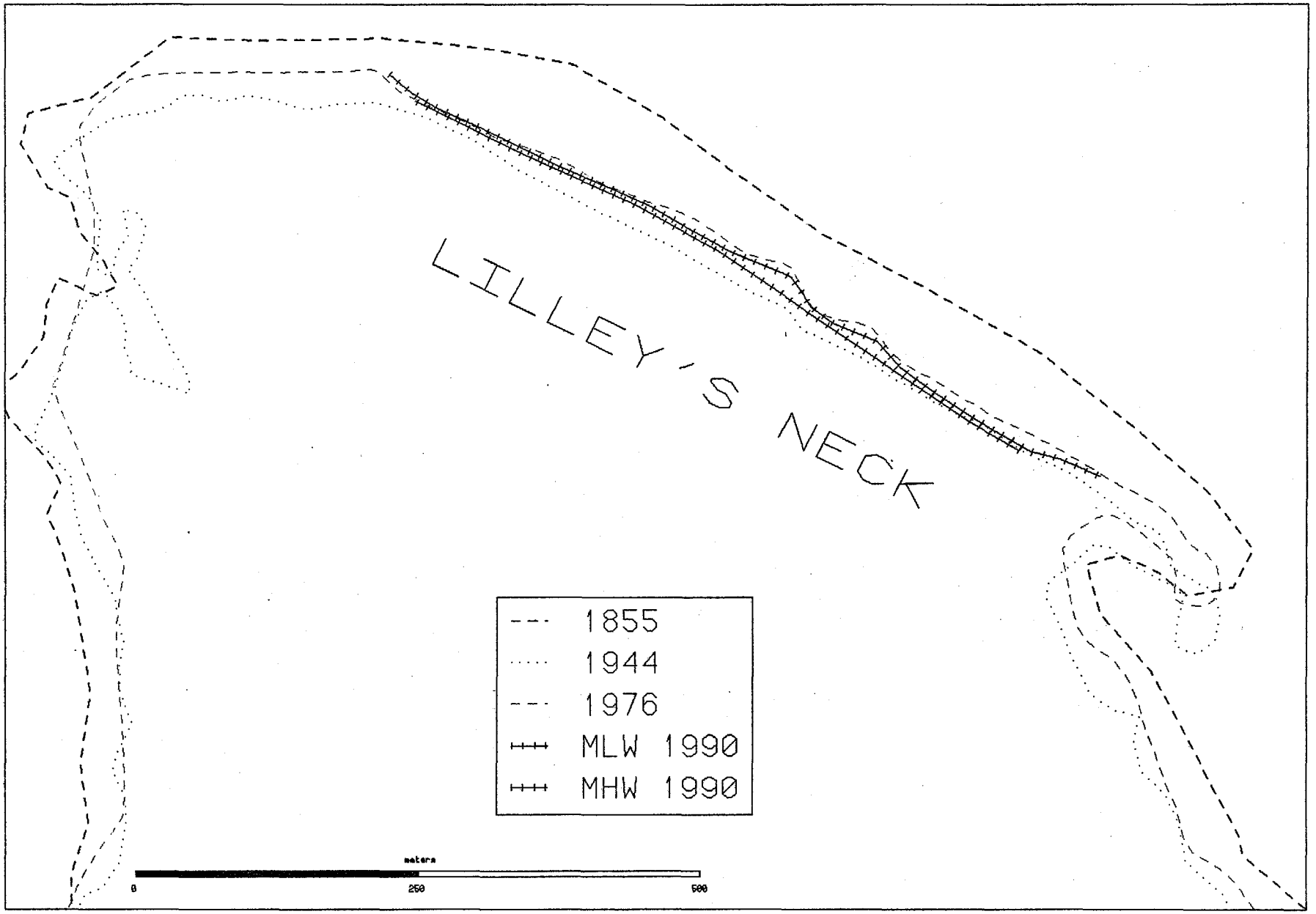
XIV. PROCEDURE FOR ANALYZING THE HISTORICAL CHANGE IN SHORELINE POSTIONS

A procedure has been developed within the GIS framework to analyze and compare historic rates of shoreline change with present-day shoreline conditions. Lilleys Neck, situated northwest of Rigby Island in Mathews County, was used as a study site. Lilleys Neck, currently a refuge, is being considered for rezoning which will potentially allow for future development.

Local governments as well as state advisory agencies are interested in assessing the historic patterns in shoreline change for this reach. The 1981 VIMS Shoreline Inventory database, now an integral component of the GIS system, reports an erosion rate of 3.1 feet per year. This estimate is based on 89 years of change from 1855 to 1944.

To accurately measure the erosion rate for this time period, the 1855 shoreline, published by the U.S. Coast and Geodetic Survey (now the National Ocean Service), was digitized at a scale of 1:20,000 and entered into the GIS database. Similarly, the 1944 U.S. Geological Survey topographic map of the region was digitized at a scale of 1:24,000. When these two coverages were superimposed an approximate erosion rate for this 89-year period was computed to be 2.9 feet per year. Within the accuracy limits of the map medium, this rate is in agreement with the rate reported in the 1981 Shoreline Inventory database. A 1976 shoreline record was also digitized from the Virginia Marine Resource Commission shoreline map series which are surveyed at a scale of 1:5000. Initial interpretation of this coverage, when compared with the historic shoreline records, suggest that the position of the shoreline has accreted substantially from its position in 1944. Analysis of 1990 vertical photographs and a ground survey of Lilleys Neck, using a Topcon GTS-3B infrared digital survey instrument, indicates that the position of the current shoreline is slightly landward of the 1976 shoreline position. This suggests that presently the shoreline is undergoing recession and the shore is in a state of erosion. Observations in the field also suggest the shore to be unstable and erosion taking place.


LILLEY'S NECK MATHEWS CO, VA
1855
1944
1976
MLW 1990
MHW 1990
LILLEY'S NECK
Stokes Creek
Whites Creek
meters
0
500
1000


LILLEY'S NECK
1855
1944
1976
MLW 1990
MHW 1990
meters
0
250
500

CHAPTER XV. PROCEDURE FOR ANALYZING THE EFFECTS OF LAND USE ON VEGETATED WETLANDS

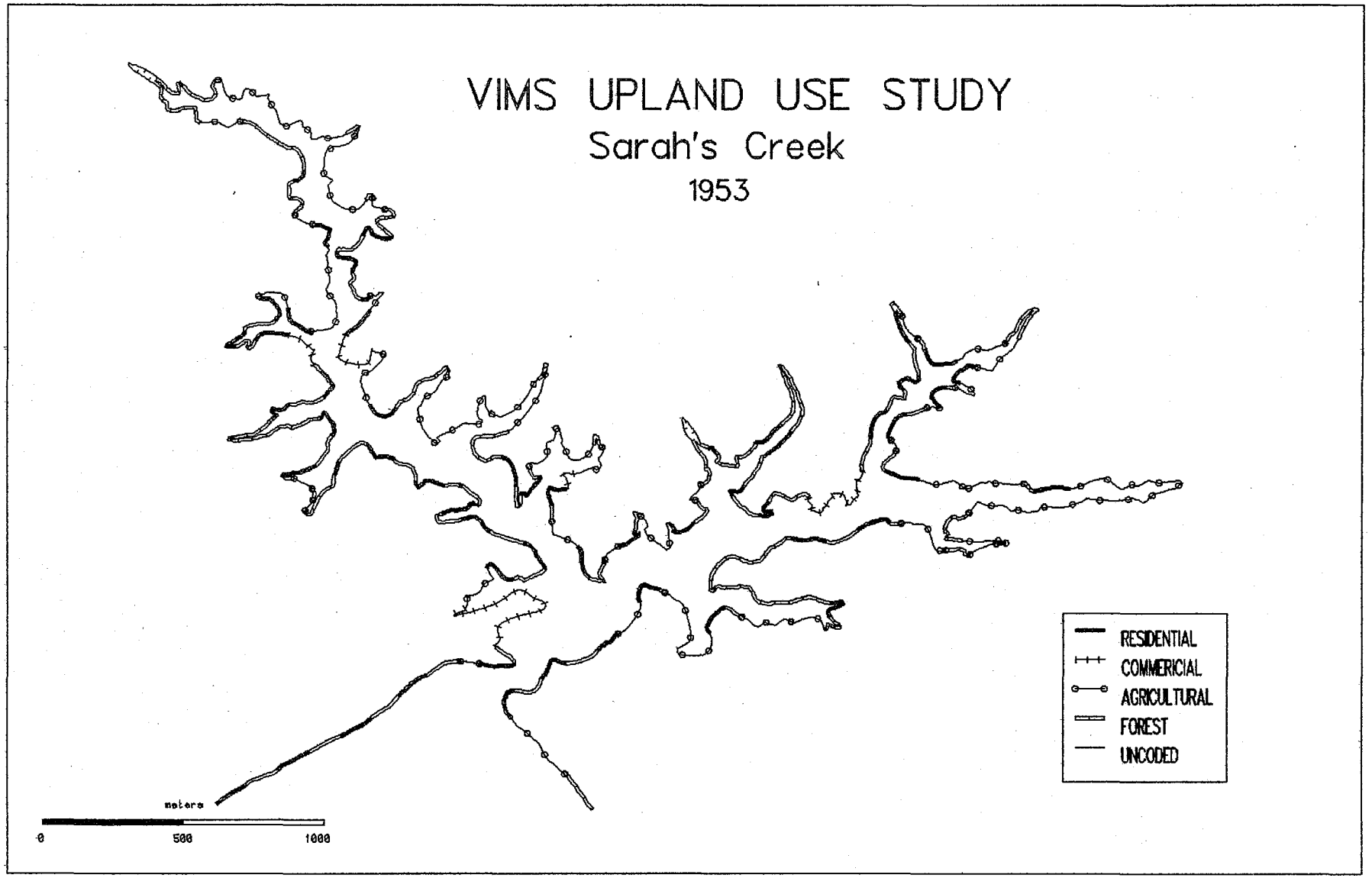
XV. PROCEDURE FOR ANALYZING THE EFFECTS OF LAND USE ON VEGETATED WETLANDS

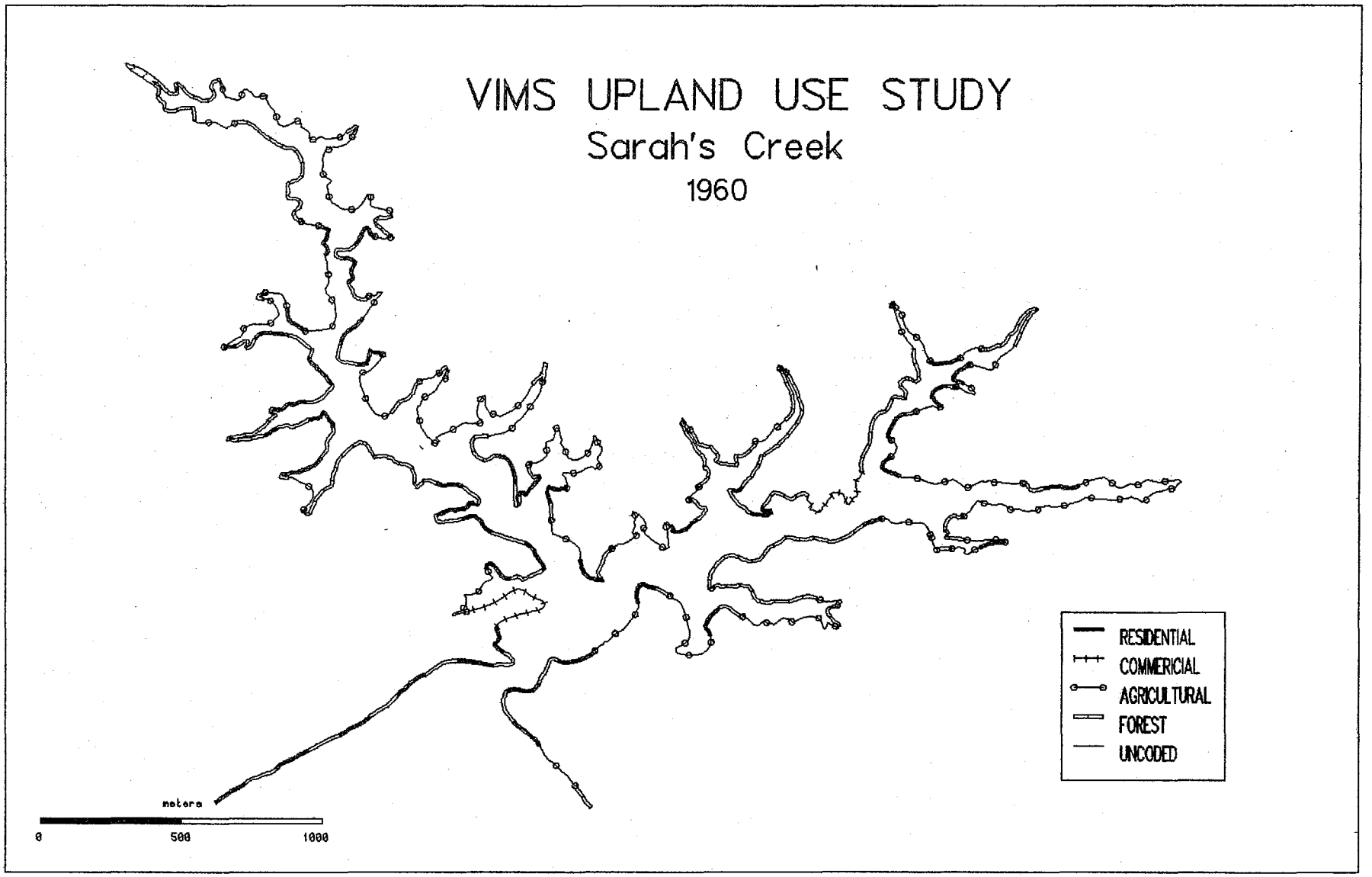
A procedure for analyzing the effects in upland land use on tidal wetlands has been developed to delineate vegetated habitats alongshore and spatially relate these environments to the adjacent upland land use patterns. It is accepted that man-induced influences along the shore contribute to the degradation of wetland habitats. Shore stabilization structures inhibit inland migration of tidal wetlands by blocking the natural intrusion of salt water from tidal fluctuations and rising sea level. Development has been responsible for filling existing wetlands as well as decreasing upland acreage potentially available for vegetation with sea level rise.

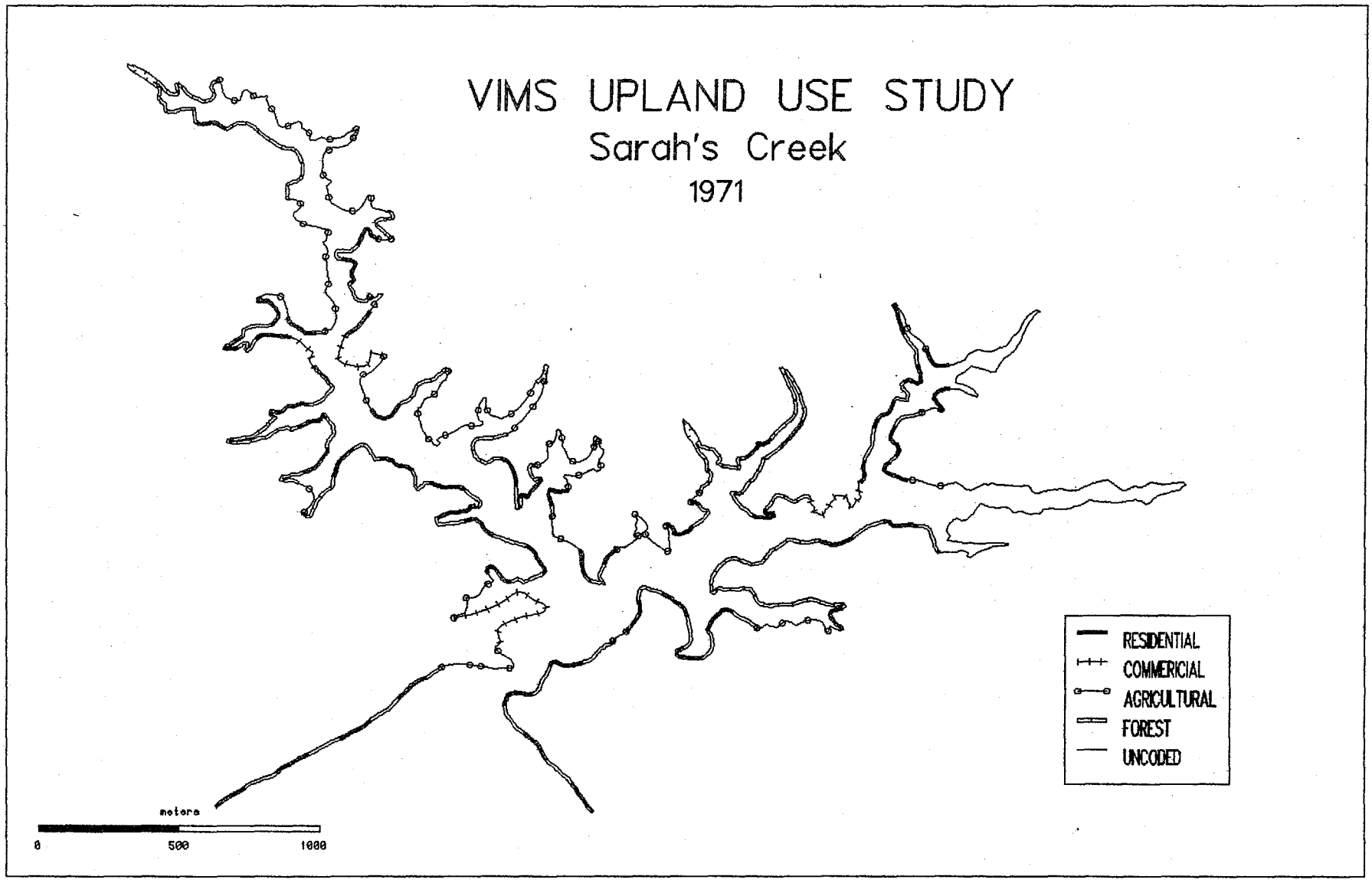
These factors and others have initiated the need for improved resource management techniques. A balance between the desire to develop within the coastal plain and the responsiblities vested in governments to protect natural resources must be established. It is suggested that the functional value of existing wetlands can be determined by examining the adjacent upland land use on a reach by reach basis. Generally, the value of an existing wetland as the potential for continued growth in inhibited by development.

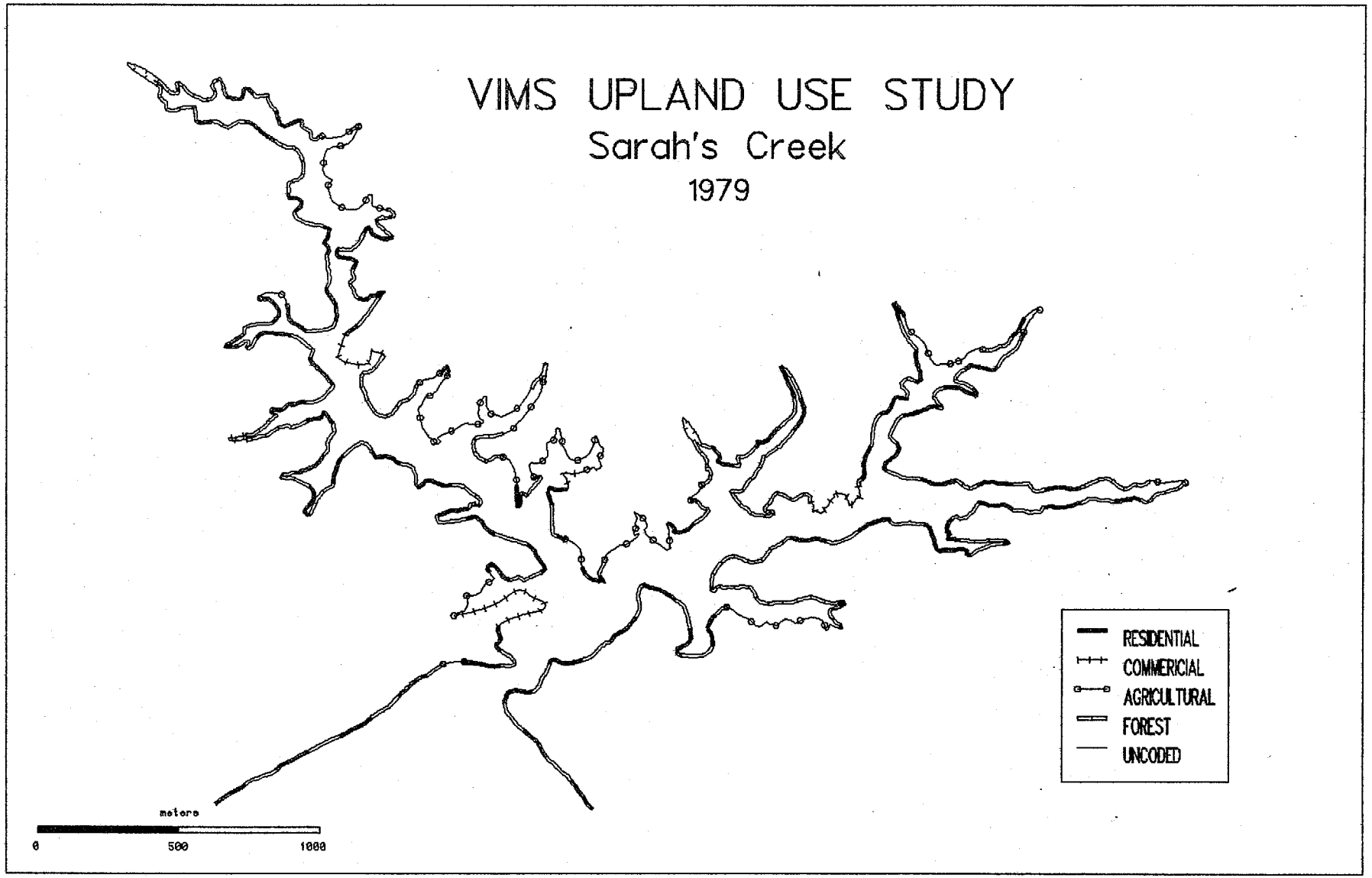
Tidal waters of Sarah's Creek and Urbanna Creek were delineated using historic and present-day vertical photographs. Upland reaches were delineated by the following land use patterns: agricultural, residential, commercial and forested. Shoreline type for historic photographs were delineated on the basis of vegetated or nonvegetated shore. Analysis of recent photographs analysed was expanded to include riprap and bulkhead structures. The tidal watershed of these creeks were ground-truthed between August and September of 1990 for accuracy in photo interpretation.

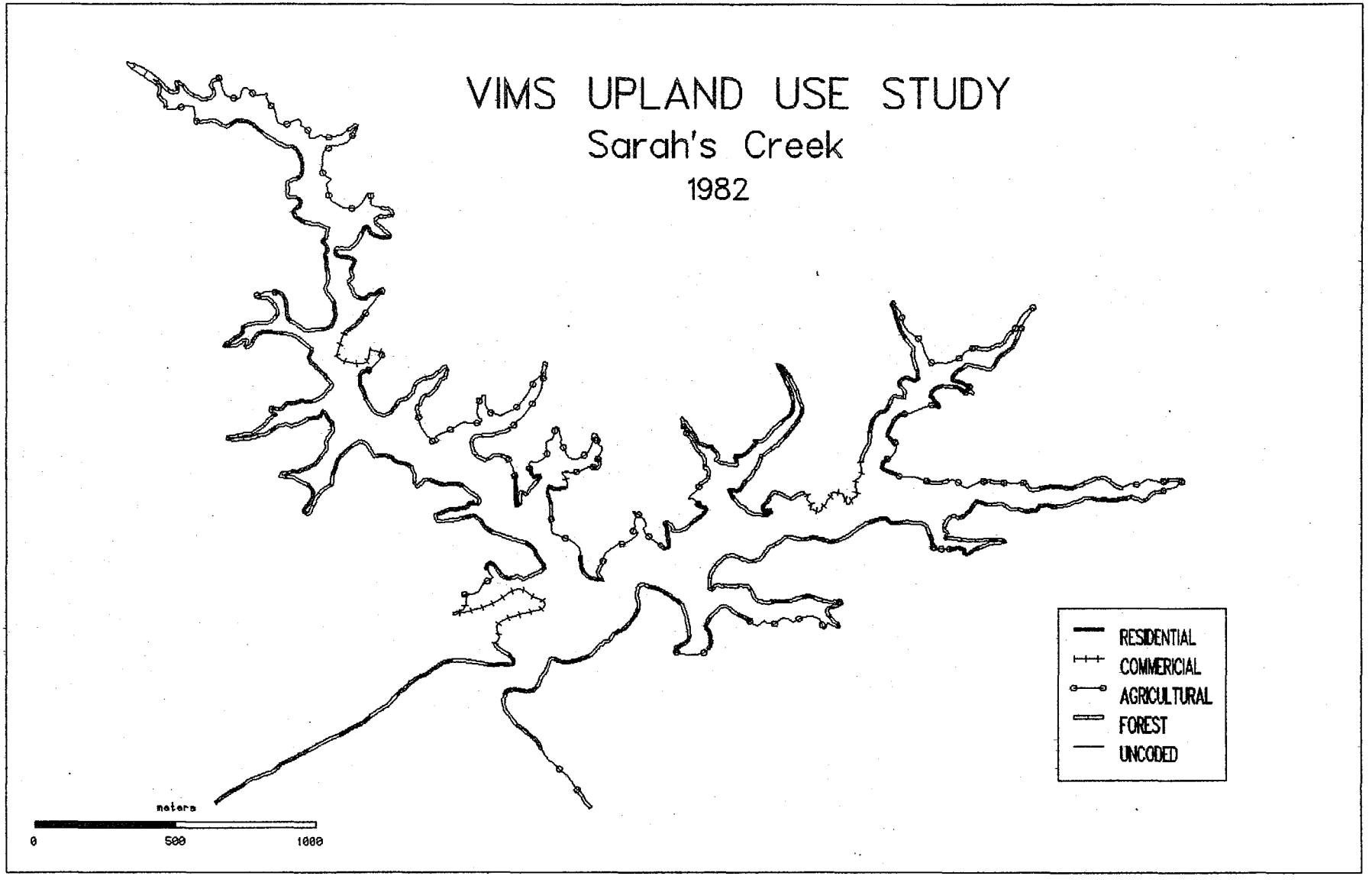
Delineations were plotted on existing 1:24,000 shoreline records in the VIMS GIS. Data was stored as two separate coverages: land use and shore condition. Nodes were entered directly to form the longshore borders of each attribute identified. Arcs were created by connecting nodes and then coded according to shore type or land usage. The length of each arc is calculated and can be totaled, if desired, for an individual attribute (e.g. total vegetated shore, forested upland, etc.). Shore condition can then be assessed and directly compared with land use patterns when the two coverages are superimposed. Historical overlays can be produced to assess changes in shoreline conditions as a function of changes in land use patterns. A decrease in vegetated shore coverage resulting from increased development could be detected. Results of historical comparisons can be used as a tool to predict the functional value of existing wetlands in lieu of present-day land uses.

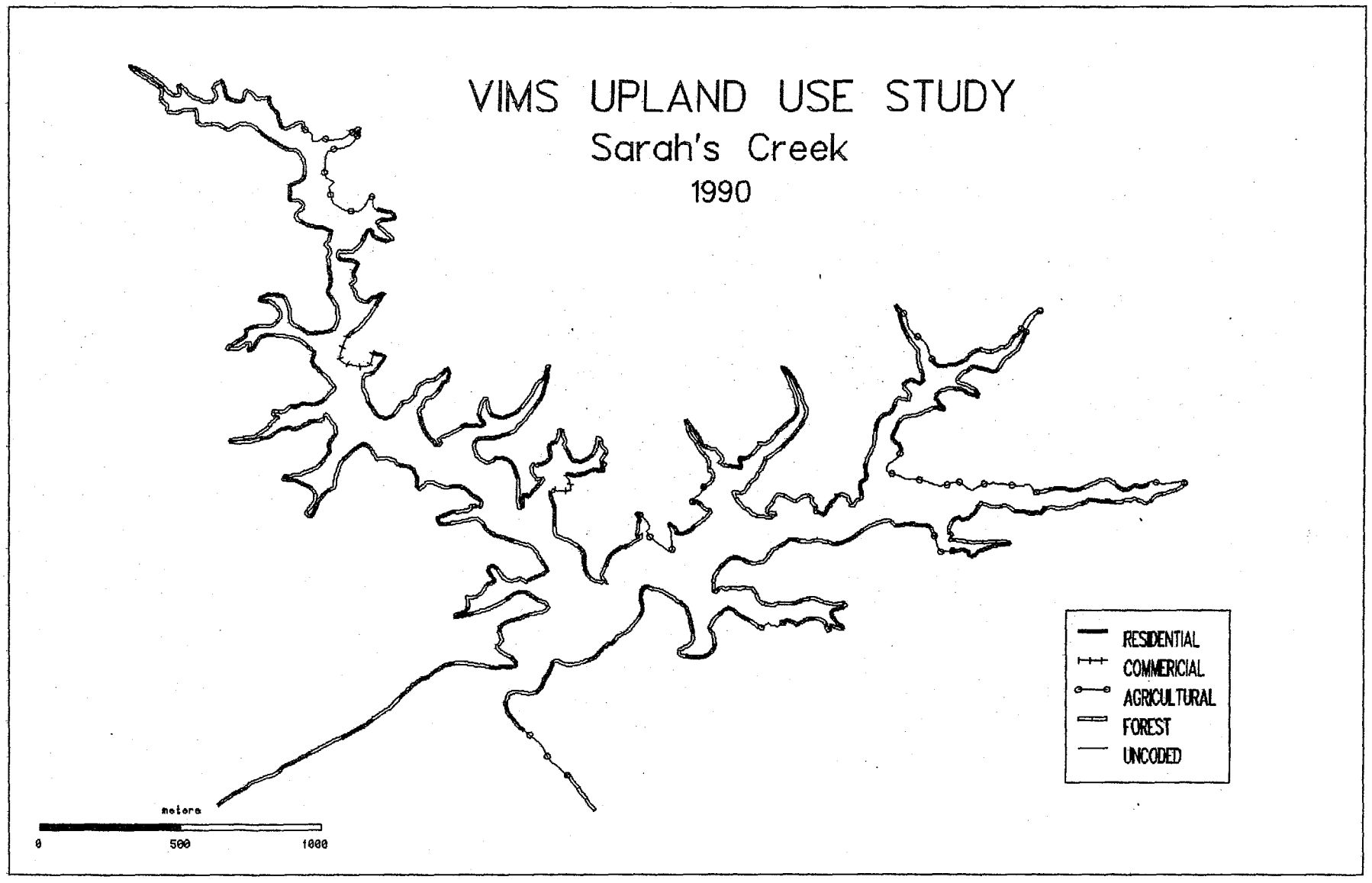

VIMS UPLAND USE STUDY
Sarah's Creek
1953
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

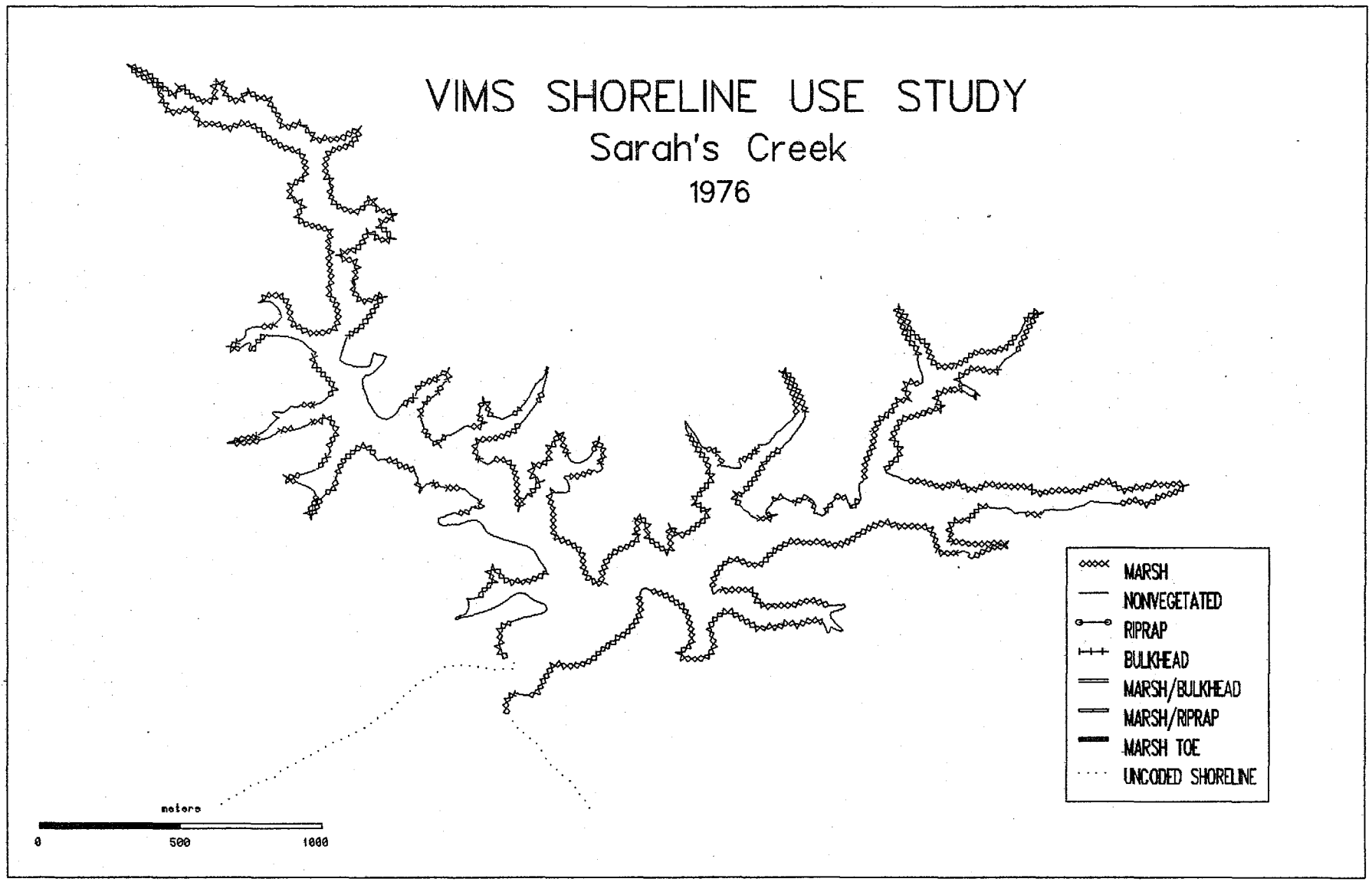

VIMS UPLAND USE STUDY
Sarah's Creek
1960
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

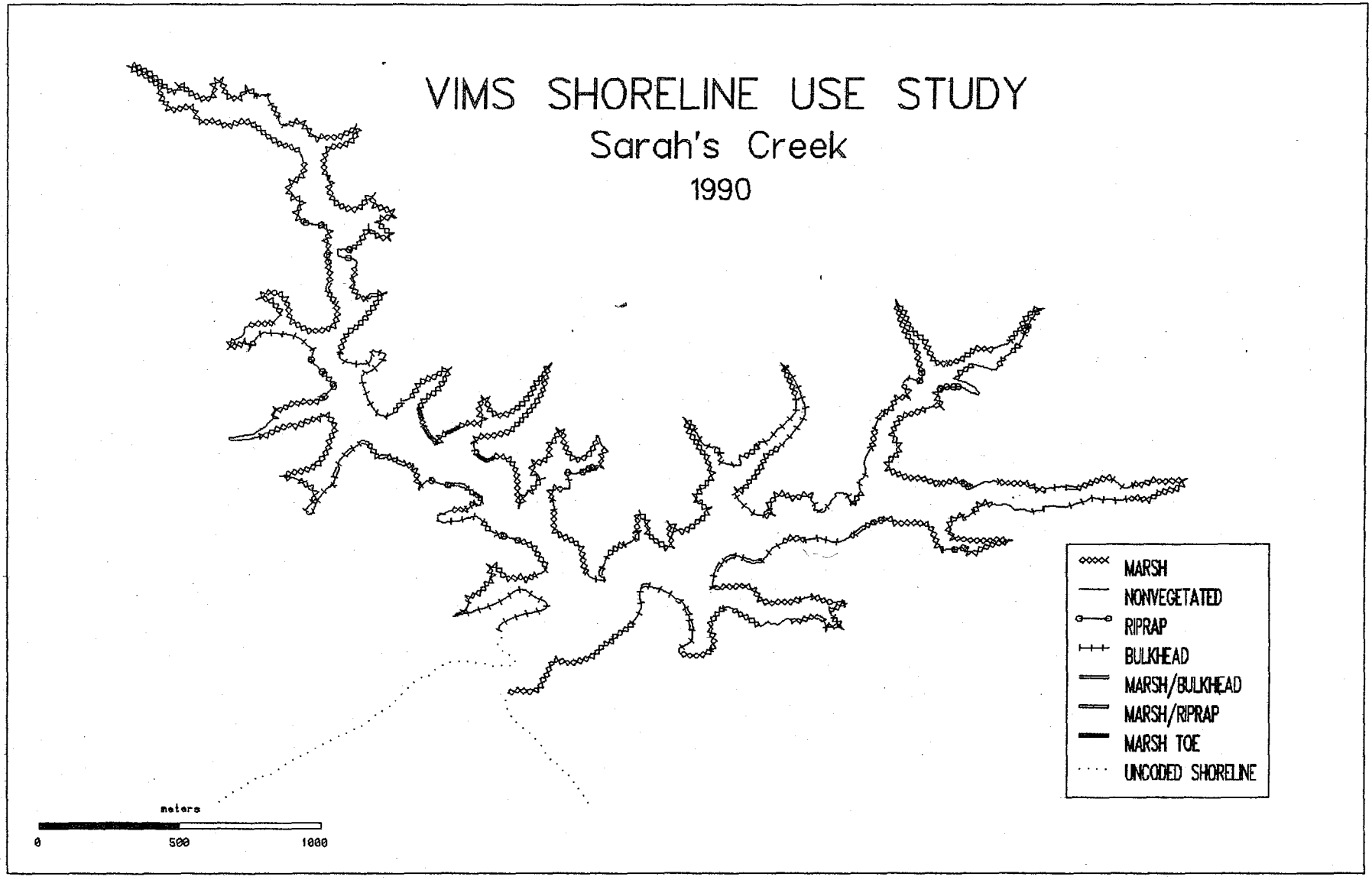

VIMS UPLAND USE STUDY
Sarah's Creek
1971
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

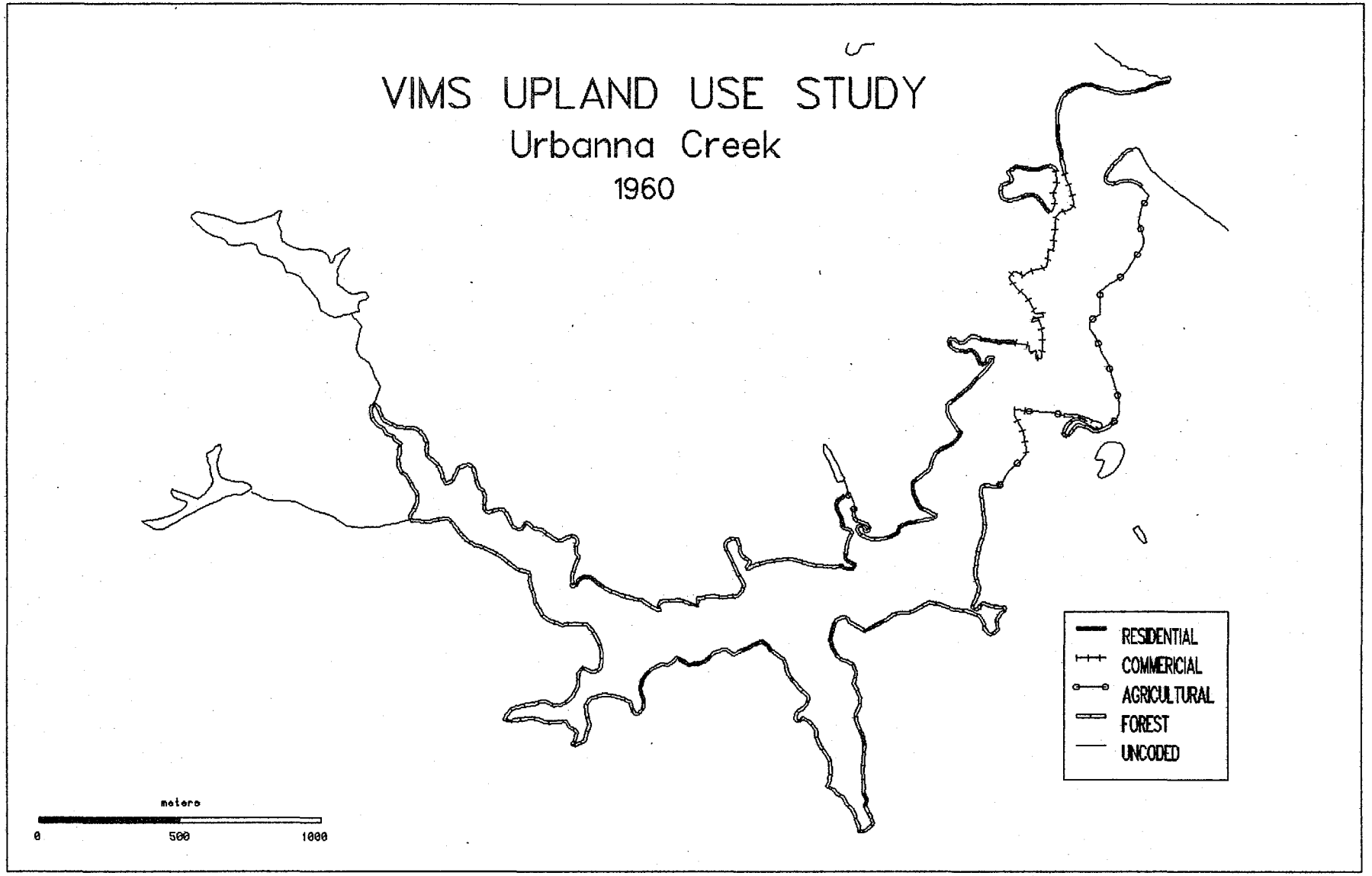

VIMS UPLAND USE STUDY
Sarah's Creek
1979
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

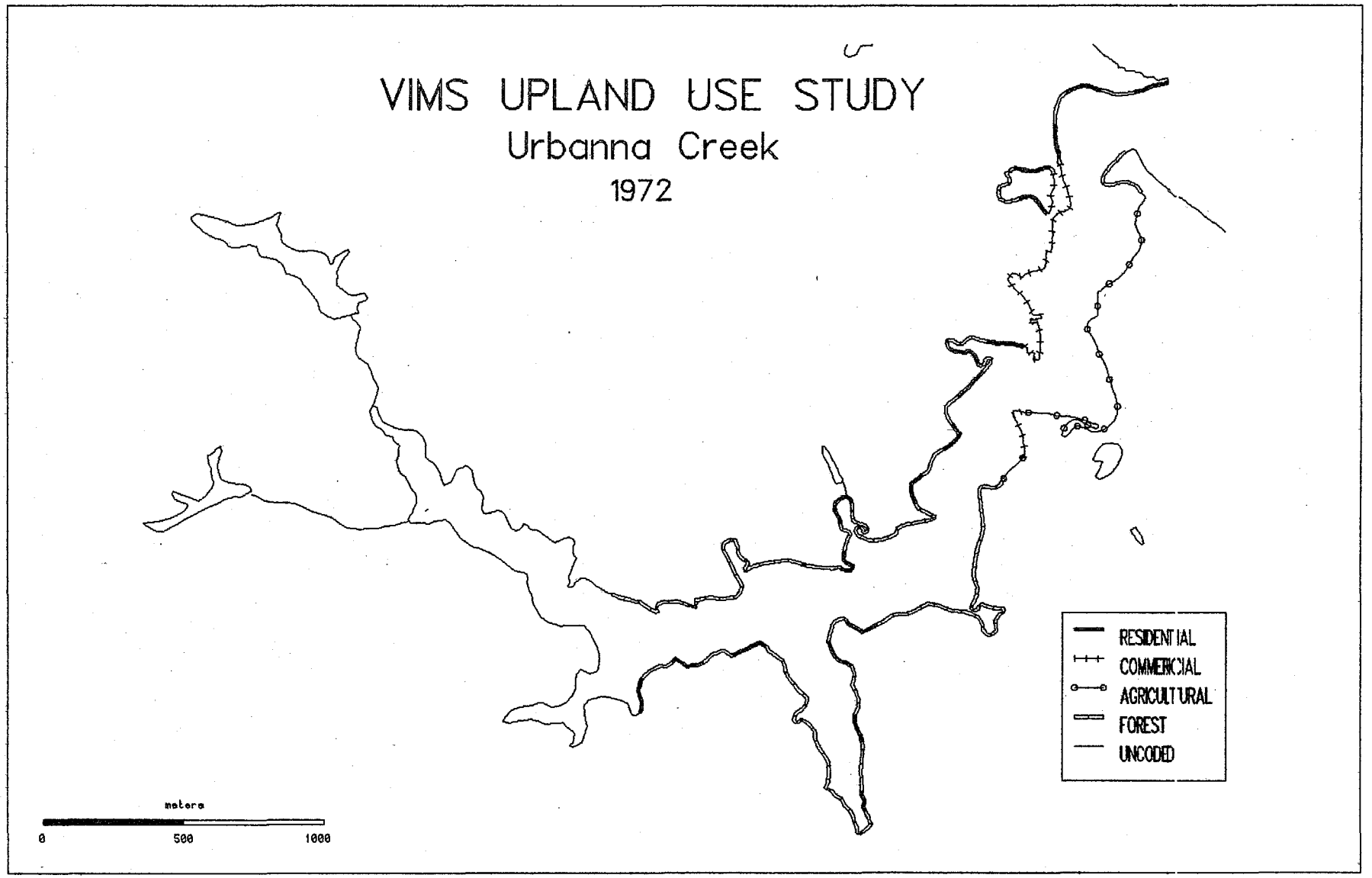

VIMS UPLAND USE STUDY
Sarah's Creek
1982
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

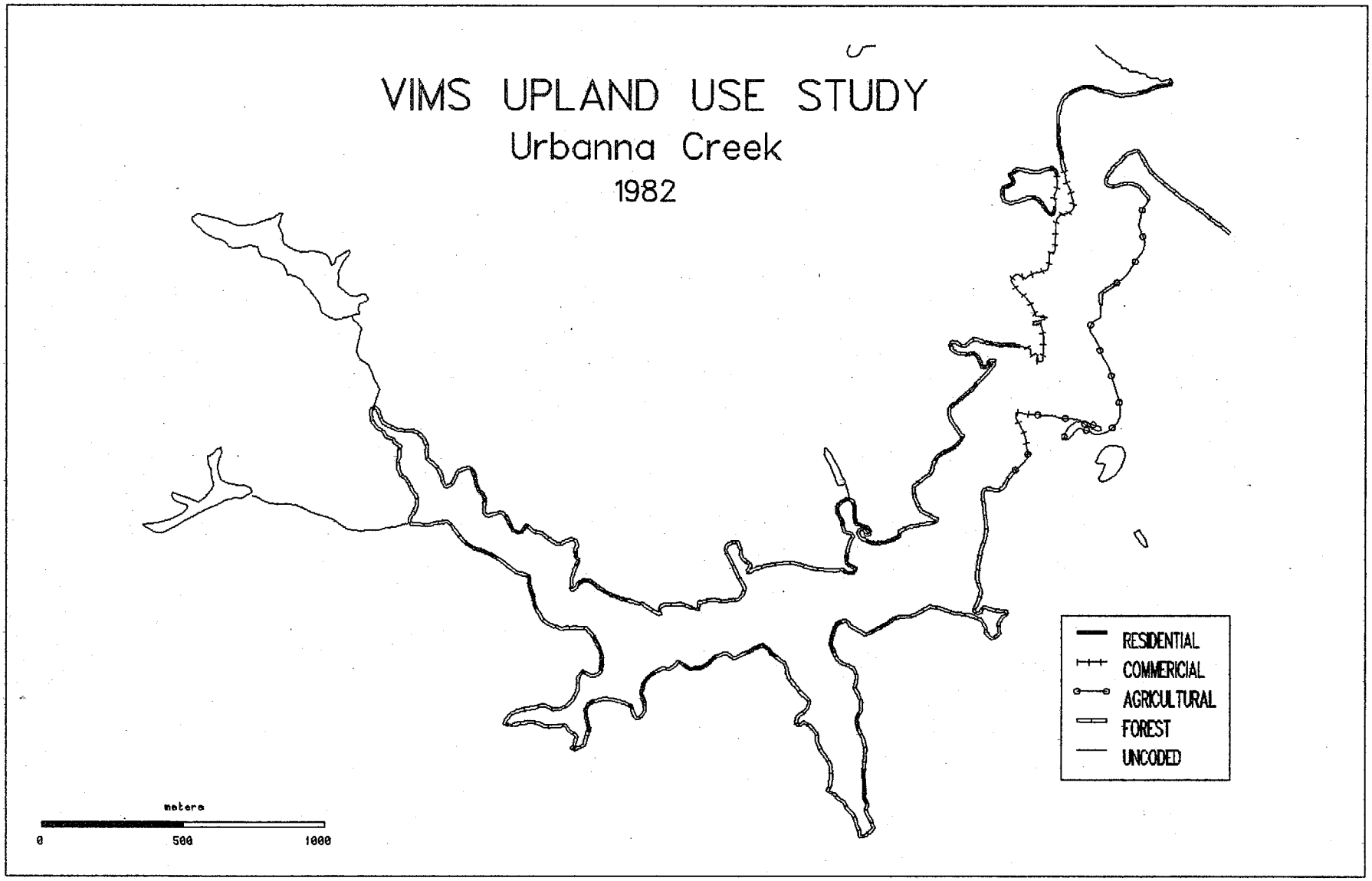

VIMS UPLAND USE STUDY
Sarah's Creek
1990
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000

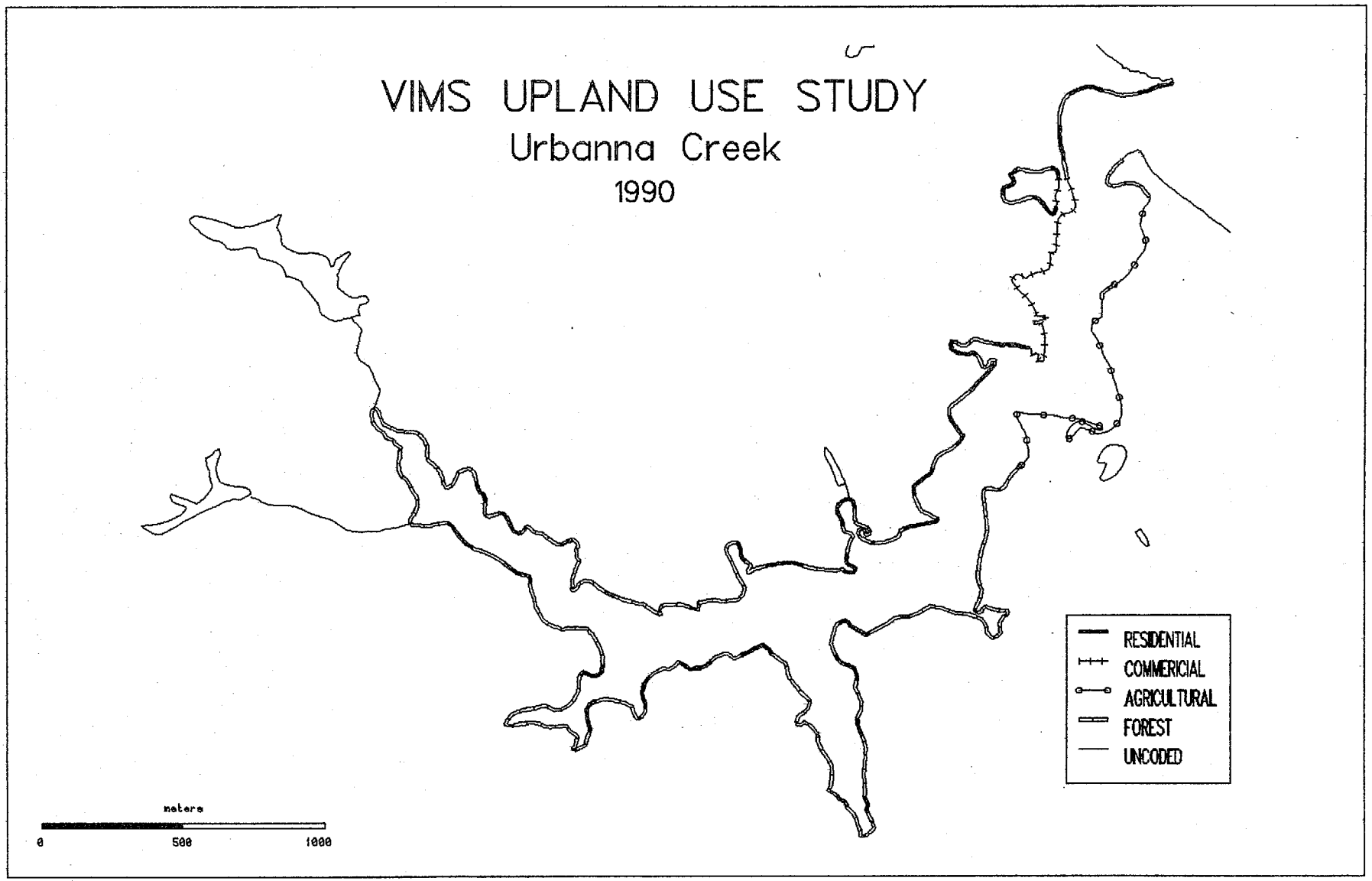

VIMS SHORELINE USE STUDY
Sarah's Creek
1976
MARSH
NONVEGETATED
RIPRAP
BULKHEAD
MARSH/BULKHEAD
MARSH/RIPRAP
MARSH TOE
UNCODED SHORELINE
meters
0
500
1000

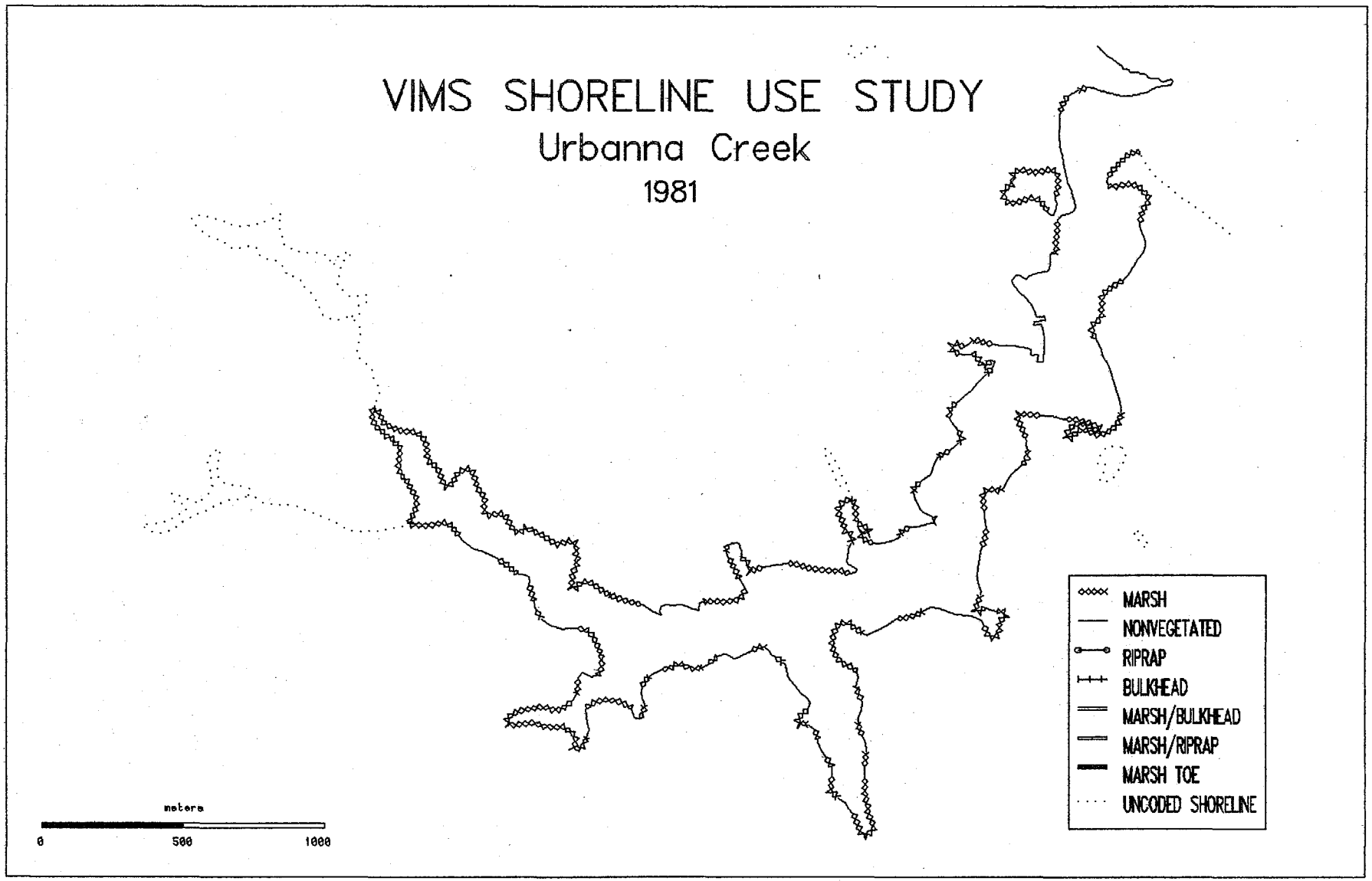

VIMS SHORELINE USE STUDY
Sarah's Creek
1990
MARSH
NONVEGETATED
RIPRAP
BULKHEAD
MARSH/BULKHEAD
MARSH/RIPRAP
MARSH TOE
UNCODED SHORELINE
meters
0
500
1000

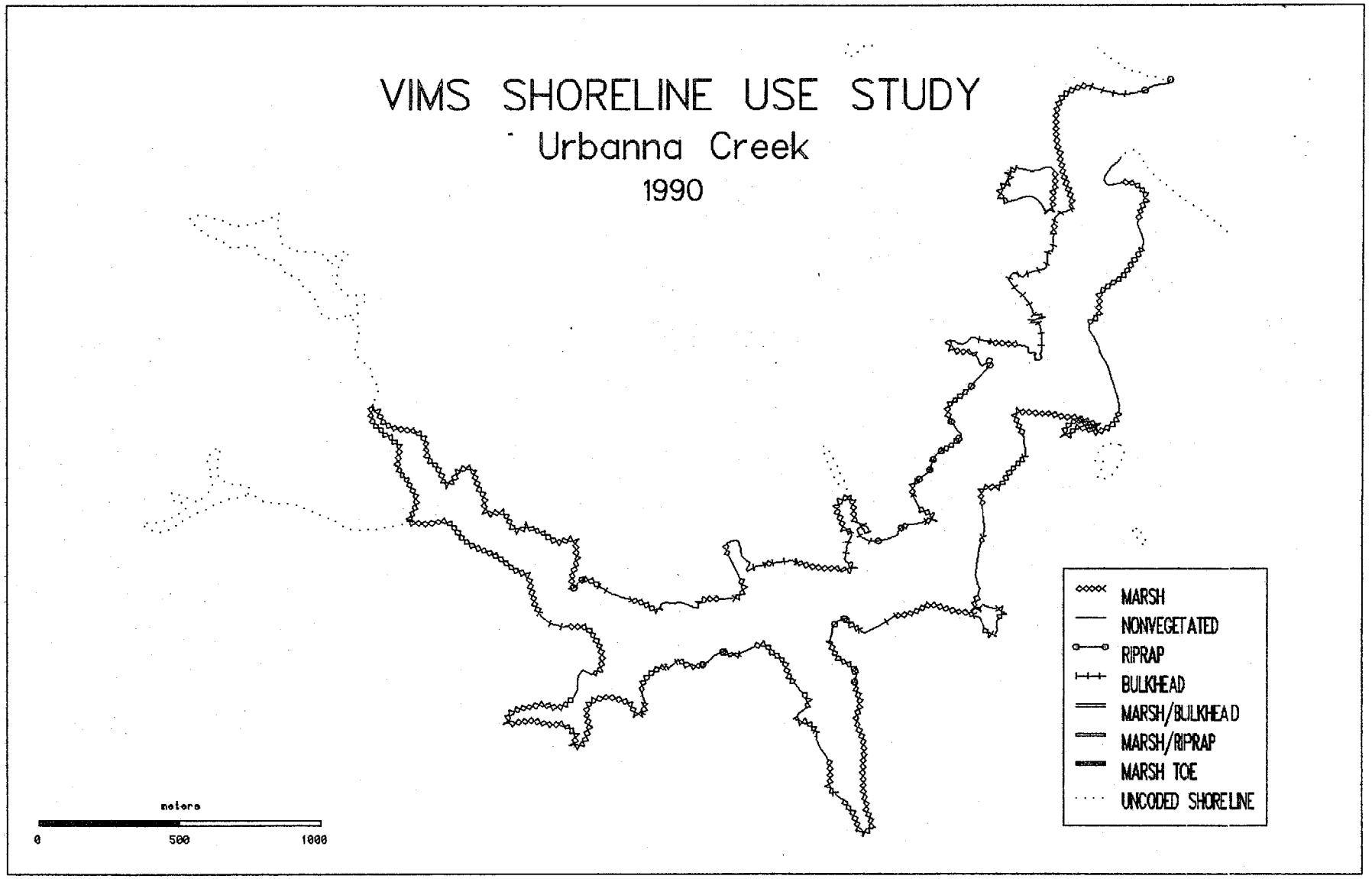

VIMS UPLAND USE STUDY
Urbanna Creek
1960
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000


VIMS UPLAND USE STUDY
Urbanna Creek
1972
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000


VIMS UPLAND USE STUDY
Urbanna Creek
1982
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000


VIMS UPLAND USE STUDY
Urbanna Creek
1990
RESIDENTIAL
COMMERICIAL
AGRICULTURAL
FOREST
UNCODED
meters
0
500
1000


VIMS SHORELINE USE STUDY
Urbanna Creek
1981
MARSH
NONVEGETATED
RIPRAP
BULKHEAD
MARSH/BULKHEAD
MARSH/RIPRAP
MARSH TOE
UNCODED SHORELINE
meters
0
500
1000

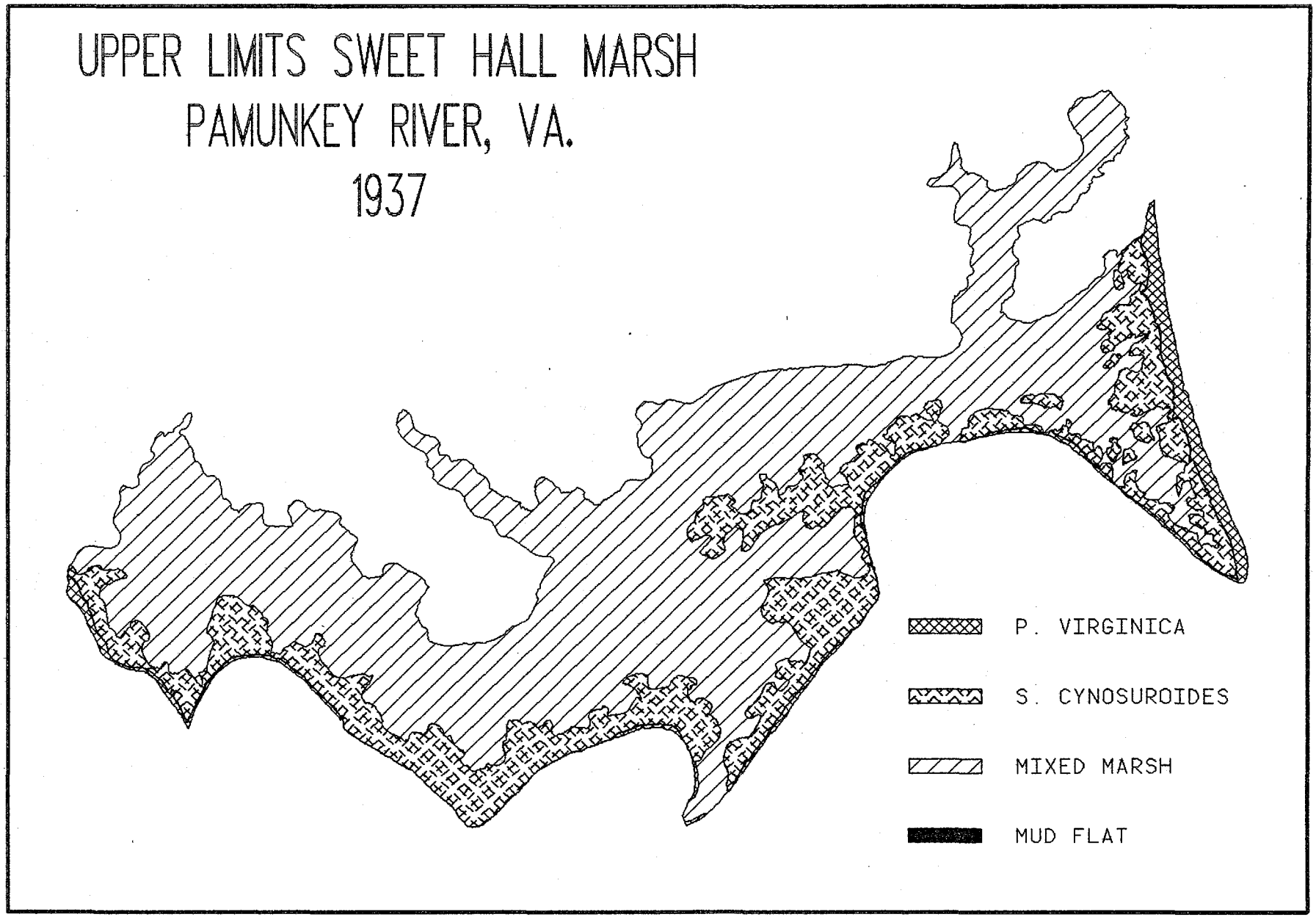

VIMS SHORELINE USE STUDY
Urbanna Creek
1990
MARSH
NONVEGETATED
RIPRAP
BULKHEAD
MARSH/BULKHEAD
MARSH/RIPRAP
MARSH TOE
UNCODED SHORELINE
meters
0
500
1000

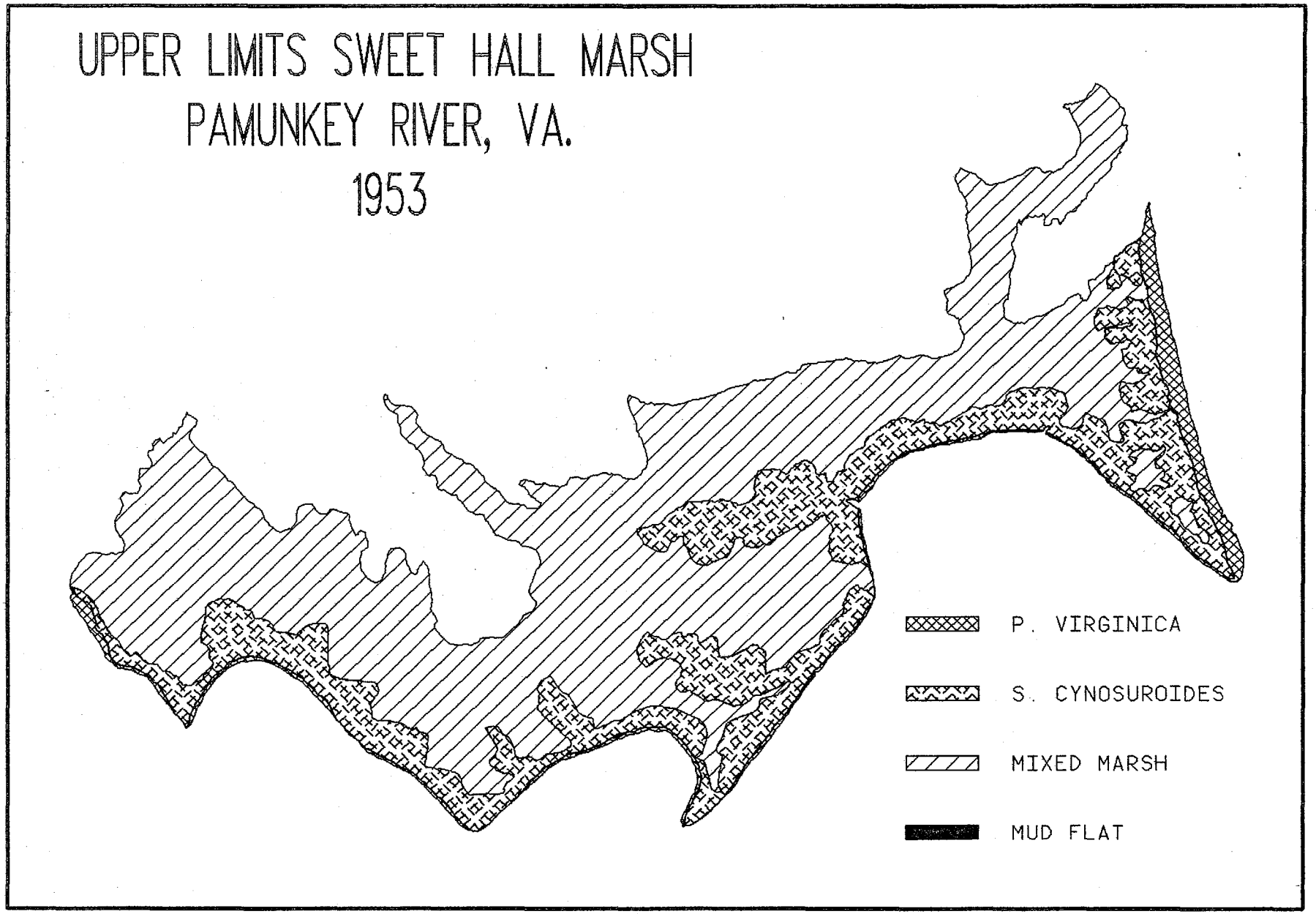
CHAPTER XVI. PROCEDURE FOR ANALYZING SPATIAL AND TEMPORAL CHANGES IN WETLAND SPECIES

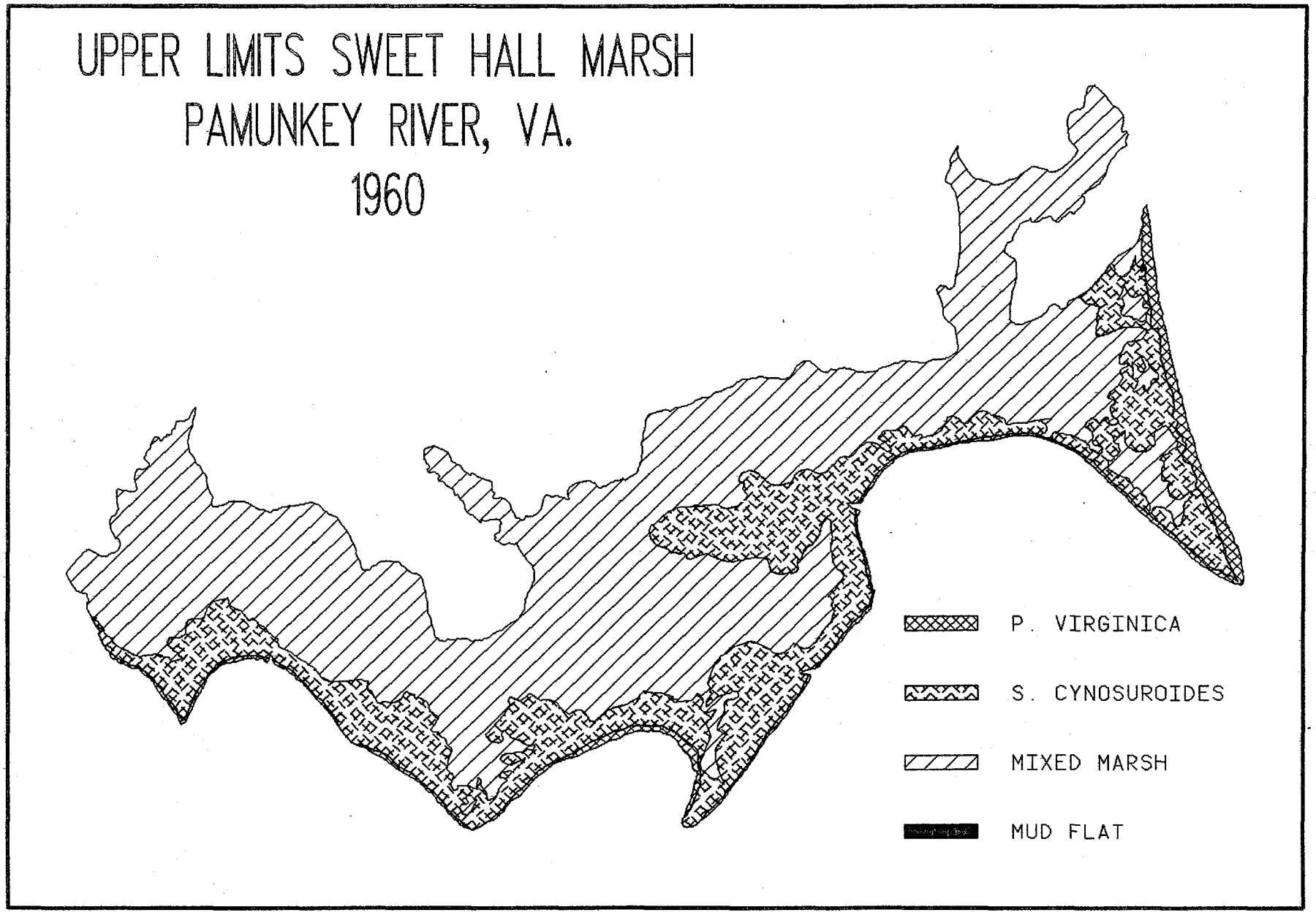
XVI. PROCEDURE FOR ANALYZING THE SPATIAL AND TEMPORAL CHANGES IN WETLAND SPECIES

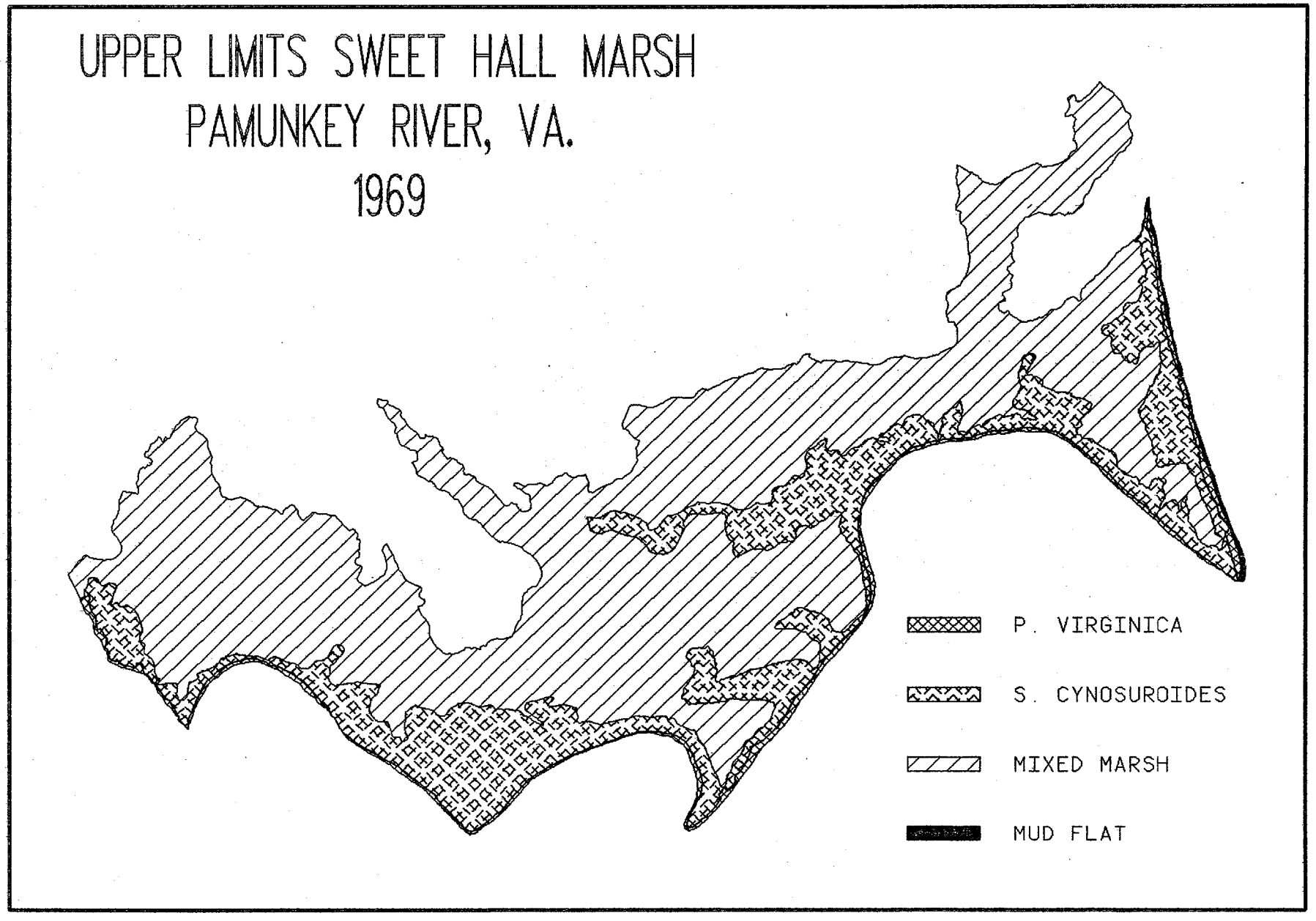
A procedure to quantify the spatial and temporal change in wetland species and habitats has been developed by the Coastal Inventory in cooperation with staff of the Wetlands Research Program. A sixty (60) hectare section of Sweethall Marsh in King William County was delineated from six (6) sets of vertical imagery photographed between 1938 and 1976. Arrow Arum (Peltandra virginica), Big Cordgrass (Spartina cynosuroides), a mixed marsh assemblage, and a tidal mudflat was hand-traced directly from the photographs for each year. Each delineation was then digitized and coded by species and entered into the GIS database. Since the delineations formed polygons, the acreage for any one species could be calculated for a given year.

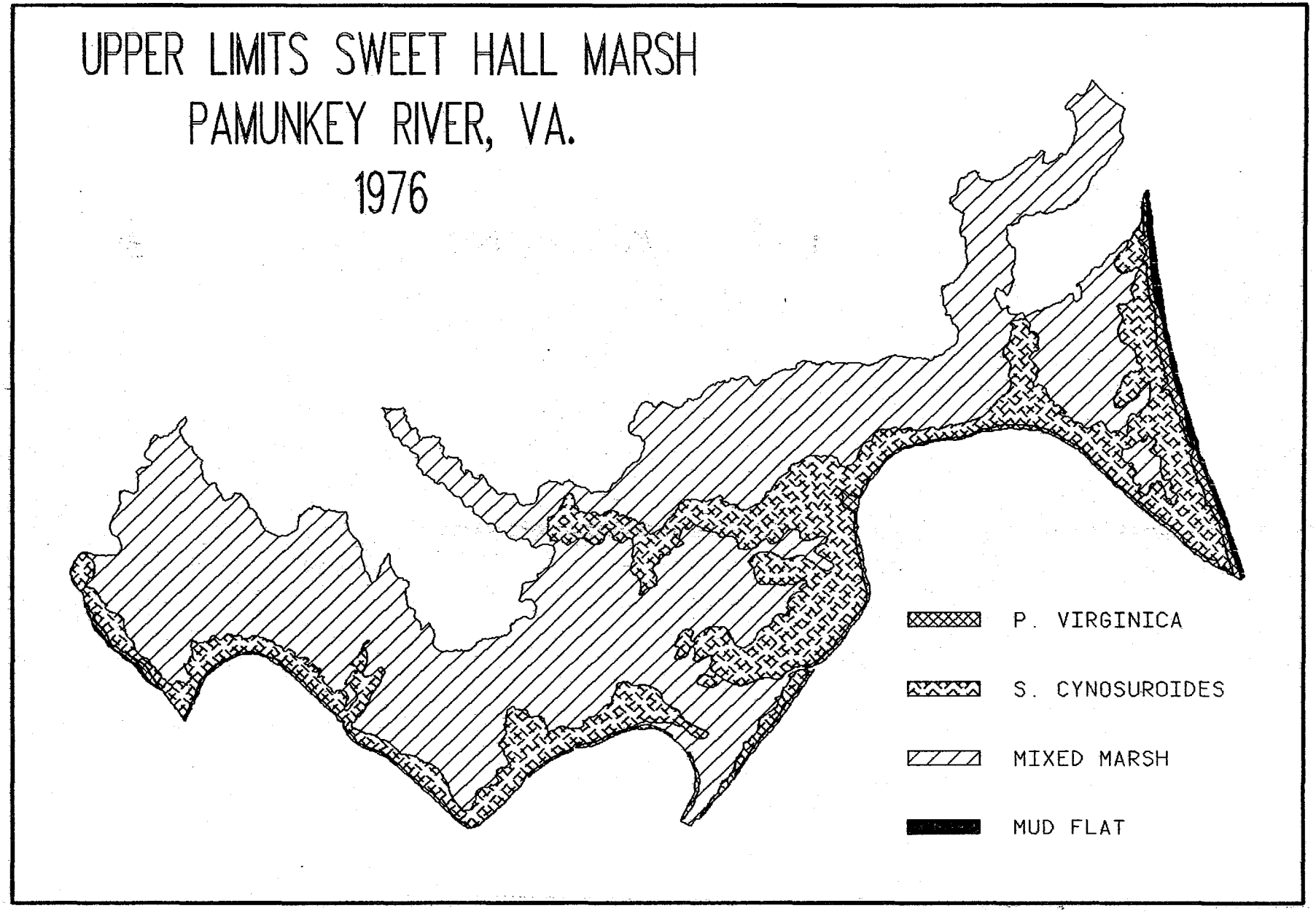
As expected, the results of the study indicated that species sensitive to high salinity environments (e.g., mixed marsh assemblage) spatially decreased over time and were eventually eradicated from the population. Species like Big Cordgrass, which are salt tolerant, increased spatially over time. Those species thriving in the tidal mudflat which could not tolerate high salinity environments were eventually replaced with species like Big Cordgrass which could. The temporal changes are likely due to an increase in salinity from external environmental pressures, and an increase in salt water inundation as a result of sea level rise.


UPPER LIMITS SWEET HALL MARSH
PAMUNKEY RIVER, VA.
1937
P. VIRGINICA
S. CYNOSUROIDES
MIXED MARSH
MUD FLAT


UPPER LIMITS SWEET HALL MARSH
PAMUNKEY RIVER, VA.
1953
P. VIRGINICA
S. CYNOSUROIDES
MIXED MARSH
MUD FLAT


UPPER LIMITS SWEET HALL MARSH
PAMUNKEY RIVER, VA.
1960
P. VIRGINICA
S. CYNOSUROIDES
MIXED MARSH
MUD FLAT


UPPER LIMITS SWEET HALL MARSH
PAMUNKEY RIVER, VA.
1969
P. VIRGINICA
S. CYNOSUROIDES
MIXED MARSH
MUD FLAT


UPPER LIMITS SWEET HALL MARSH
PAMUNKEY RIVER, VA.
1976
P. VIRGINICA
S. CYNOSUROIDES
MIXED MARSH
MUD FLAT

APPENDICES

APPENDIX I.

COMPREHENSIVE COASTAL INVENTORY

COMPLETED TOPOGRAPHIC COVERAGES

QUAD NAME & NUMBER	SHO	WAT	TMI	NWI	LRB	RVR	SHL	FPA	ECO	ERP	FLL
ACHILLES 5907			0		X	X	0			X	
BEULAHVILLE 5311		*									
CHAMPLAIN 5513			0	X	X	X	0				X
CLAY BANK 5807			0		X	X	0		X	X	
COLONIAL BEACH NORTH 5515			0	X	X	X	0				X
COLONIAL BEACH SOUTH 5514			0	X	X	X	0				X
DAHLGREN 5415			0				0				X
DELTAVILLE 6009					X	X	0				
FLEETS BAY 6010			0		X	X	0				
GRESSIT 5708					X	X			X	X	
HANOVER 5211		*									
HEATHSVILLE 5912			0		X	X	0				
IRVINGTON 5910			X		X	X	X				
KING & QUEEN COURTHOUSE 5510	*	*	*								
KING WILLIAM 5410	*	*	*	X							
KINSALE 5813			0		X	X	0				X
LORETTO 5413			0				0				X
MACHODOC 5713			0		X	X	0				X
MANQUIN 5310	*	*	*	X			0				
MATHEWS 6008					X	X	0			X	

QUAD NAME & NUMBER	SHO	WAT	TMI	NWI	LRB	RVR	SHL	FPA	ECO	ERP	FLL
MORATICO 5711			0		X	X	0				
NEW KENT 5509	*	*	*	*							
NEW POINT COMFORT 6007			0		X	X	0		X	X	
PINEY POINT 5814			0		X	X	0				X
POQUOSON EAST 6006					X	X	0		X	X	
POQUOSON WEST 5906					X	X				X	
QUINTON 5309		*		X							
REEDSVILLE 6011			0		X	X	0				
ROLLINS FORK 5414			0				0				X
ST. CLEMENTS ISLAND 5714	X		X	X	X	X	X	X			X
ST. GEORGE ISLAND 5913			0		X		0				
SEVEN PINES 5209		*									
STRATFORD HALL 5614			X	X	X	X	X				X
STUDLEY 5210	*	*					0				
TAPPAHANNOCK 5612			0		X	X	0				
TOANO 5608	*	*	*		0	0					
TUNSTALL 5409	*	*	*	*			0				
URBANNA 5810			X		X	X	X				
WALKER 5508	*	*	*								
WEST POINT 5609	*	*	*	*	0	0					
WILTON 5909			0		X	X	0				
YORKTOWN 5806			X	X			X				
WILLIAMSBURG 5707					0	0	0				

QUAD NAME & NUMBER	SHO	WAT	TMI	NWI	LRB	RVR	SHL	FPA	ECO	ERP	FLL
DUTCH GAP 5208							0				
CHARLES CITY 5407			0		0	0	0				
NEWPORT NEWS SOUTH 5904					0	0	0				
HAMPTON 6005					0	0					
ELLIOTTS CREEK 6206						0					
CAPE CHARLES 6207					0	0					
HOG ISLAND 5706					0	0					
SURRY 5606					0	0					
MULBERRY ISLAND 5805					0	0					
NORFOLK NORTH 6004					0	0					
LITTLE CREEK 6104					0	0					
FISHERMANS ISLAND 6305					0	0					
TOWNSEND 6306					0	0					
FRANKTOWN 6308					0	0					
JAMESVILLE 6309					0	0					
NANDUA CREEK 6310					0	0					
GREAT FOX ISLAND 6312					0	0					
CHESCONESSEX 6411					0	0					
PUNGOTEAGUE 6410					0	0					
PARKSLEY 6511					0	0					
SAXIS 6512					0	0					
NEW POINT COMFORT 6007						0					
MATHEWS 6008						0					

QUAD NAME & NUMBER	SHO	WAT	TMI	NWI	LRB	RVR	SHL	FPA	ECO	ERP	FLL
HOPEWELL 5207					0	0	0				
WESTOVER 5307			0		0	0	0				
CLAREMONT 5506			0		0	0	0				
BRANDON 5507			0		0	0	0				
MOUNT LANDING 5512			0		0	0	0				
NORGE 5607			0				0				
TRUHART 5610							0				
DUNNSVILLE 5611			0		0	0	0				
MONTROSS 5613			0				0				
CHURCH VIEW 5710					0	0	0				
HAYNESVILLE 5712			0				0				
SUFFOLK 5802							0				
BENNS CHURCH 5804							0				
GLOUCESTER 5808			0				0				
SALUDA 5809			0		0	0	0				
LIVELY 5811			0			0	0				
LOTTSBURG 5812			0				0				
BOWERS HILL 5903							0				
NEWPORT NEWS NORTH 5905					0	0	0				
WARENECK 5908							0				
LANCASTER 5911			0				0				
BURGESS 6012			0		0	0	0				
KEMPSVILLE 6103							0				

LEGEND

*- INDICATES COVERAGES CREATED BETWEEN 3/88 AND 3/89
X- INDICATES COVERAGES CREATED FROM 3/89 TO 9/89
O- INDICATES COVERAGES COMPLETED FROM 9/89 TO 9/90

SHO-SHORELINE CLASSIFICATION 1:24000
WAT-WATERSHED BOUNDARIES 1:24000
TMI-TIDAL MARSH INVENTORIES 1:24000
NWI-NATIONAL WETLANDS INVENTORIES 1:24000
LRB-LEFT/RIGHT BANK FROM USGS DLG'S 1:100000
RVR-RIVER REACH COVERAGES 1:100000
SHL-SHORELINE COVERAGES 1:24000
FPA-FLOOD PRONE AREAS 1:24000
FLL-FLIGHT LINE TRAJECTORIES 1:24000
ECO-ECOLOGICALLY SENSITIVE AREAS 1:24000
ERP-ESTUARINE RESEARCH PRESERVES 1:24000

APPENDIX II.

COMPREHENSIVE COASTAL INVENTORY

HIGH RESOLUTION SHORELINE COVERAGES

QUAD NAME & NUMBER	MRC	NSHL	SED	STRUCTS
WESTMORELAND CO SHORELINE 6002540	X		0	
WESTMORELAND CO SHORELINE 6002560	X		0	
WESTMORELAND CO SHORELINE 6152540	X		0	
WESTMORELAND CO SHORELINE 6152560	X	0	0	0
WESTMORELAND CO SHORELINE 6302500	X		0	
WESTMORELAND CO SHORELINE 6302540	X		0	
WESTMORELAND CO SHORELINE 6302560	X	0	0	0
WESTMORELAND CO SHORELINE 6302580	X			
WESTMORELAND CO SHORELINE 6452500	X		0	
WESTMORELAND CO SHORELINE 6452520	X		0	
WESTMORELAND CO SHORELINE 6452540	X	0	0	0
WESTMORELAND CO SHORELINE 6452560	X		0	
WESTMORELAND CO SHORELINE 6602460	X		0	
WESTMORELAND CO SHORELINE 6602480	X		0	
WESTMORELAND CO SHORELINE 6602500	X		0	
WESTMORELAND CO SHORELINE 6602520	X	0	0	0
WESTMORELAND CO SHORELINE 6602540	0	0	0	0
WESTMORELAND CO SHORELINE 752420	0		0	

QUAD NAME & NUMBER	MRC	NSHL	SED	STRUCTS
WESTMORELAND CO SHORELINE 6752440	0		0	
WESTMORELAND CO SHORELINE 6752460	0		0	
WESTMORELAND CO SHORELINE 6902420	0		0	
WESTMORELAND CO SHORELINE 6902440	0		0	
WESTMORELAND CO SHORELINE 7052400	0		0	
WESTMORELAND CO SHORELINE 7052420	0		0	
WESTMORELAND CO SHORELINE 7052440	0		0	
WESTMORELAND CO SHORELINE 7202400	0		0	
WESTMORELAND CO SHORELINE 7202420	0		0	
WESTMORELAND CO SHORELINE 7352400	0		0	
RICHMOND CO SHORELINE 5252520	0		0	
RICHMOND CO SHORELINE 5402500	0		0	
RICHMOND CO SHORELINE 5402520	0		0	
RICHMOND CO SHORELINE 5402540	0		0	
RICHMOND CO SHORELINE 5552460	0		0	
RICHMOND CO SHORELINE 5552480	0		0	
RICHMOND CO SHORELINE 5552500	0		0	
RICHMOND CO SHORELINE 5552520	0		0	
RICHMOND CO SHORELINE 5702460	0		0	
RICHMOND CO SHORELINE 5702480	0		0	
RICHMOND CO SHORELINE 5852460	0		0	
RICHMOND CO SHORELINE 5852480	0		0	
RICHMOND CO SHORELINE 6002460	0		0	

QUAD NAME & NUMBER	MRC	NSHL	SED	STRUCTS
RICHMOND CO SHORELINE 6002480	0		0	
LANCASTER CO SHORELINE 4652600	0		0	
LANCASTER CO SHORELINE 4652620	0		0	
LANCASTER CO SHORELINE 4652640	0		0	
LANCASTER CO SHORELINE 4802560	0		0	
LANCASTER CO SHORELINE 4802580	0		0	
LANCASTER CO SHORELINE 4802600	0		0	
LANCASTER CO SHORELINE 4802620	0		0	
LANCASTER CO SHORELINE 4802640	0		0	
LANCASTER CO SHORELINE 4952560	0		0	
LANCASTER CO SHORELINE 4952580	0		0	
LANCASTER CO SHORELINE 4952600	0		0	
LANCASTER CO SHORELINE 4952620	0		0	
LANCASTER CO SHORELINE 5102540	0		0	
LANCASTER CO SHORELINE 5102560	0		0	
LANCASTER CO SHORELINE 5102580	0		0	
LANCASTER CO SHORELINE 5102600	0		0	
LANCASTER CO SHORELINE 5252520	0		0	
LANCASTER CO SHORELINE 5252540	0		0	
LANCASTER CO SHORELINE 5252580	0		0	
LANCASTER CO SHORELINE 5402520	0		0	
LANCASTER CO SHORELINE 5402540	0		0	
NORTHUMBERLAND CO SHORELINE 4952600	0		0	

QUAD NAME & NUMBER	MRC	NSHL	SED	STRUCTS
NORTHUMBERLAND CO SHORELINE 4952620	0		0	
NORTHUMBERLAND CO SHORELINE 5102620	0		0	
NORTHUMBERLAND CO SHORELINE 5252600	0		0	
NORTHUMBERLAND CO SHORELINE 5252620	0		0	
NORTHUMBERLAND CO SHORELINE 5252640	0		0	
NORTHUMBERLAND CO SHORELINE 5402600	0		0	
NORTHUMBERLAND CO SHORELINE 5402620	0		0	
NORTHUMBERLAND CO SHORELINE 5402640	0		0	
NORTHUMBERLAND CO SHORELINE 5552580	0		0	
NORTHUMBERLAND CO SHORELINE 5552600	0		0	
NORTHUMBERLAND CO SHORELINE 5552620	0		0	
NORTHUMBERLAND CO SHORELINE 5552640	0		0	
NORTHUMBERLAND CO SHORELINE 5702580	0		0	
NORTHUMBERLAND CO SHORELINE 5702600	0		0	
NORTHUMBERLAND CO SHORELINE 5702620	0		0	
NORTHUMBERLAND CO SHORELINE 5702640	0		0	
NORTHUMBERLAND CO SHORELINE 5852560	0		0	
NORTHUMBERLAND CO SHORELINE 5852580	0		0	
NORTHUMBERLAND CO SHORELINE 5852600	0		0	
NORTHUMBERLAND CO SHORELINE 5852620	0		0	
NORTHUMBERLAND CO SHORELINE 6002540	0		0	
NORTHUMBERLAND CO SHORELINE 6002560	0		0	
NORTHUMBERLAND CO SHORELINE 6002580	0		0	

QUAD NAME & NUMBER	MRC	NSHL	SED	STRUCTS
NORTHUMBERLAND CO SHORELINE 6002600	0		0	
NORTHUMBERLAND CO SHORELINE 6152540	0		0	
NORTHUMBERLAND CO SHORELINE 6152560	0		0	
NORTHUMBERLAND CO SHORELINE 6152580	0		0	

LEGEND

*- INDICATES COVERAGES CREATED BETWEEN 3/88 AND 3/89
X- INDICATES COVERAGES CREATED FROM 3/89 TO 9/89
0- INDICATES COVERAGES COMPLETED FROM 9/89 TO 9/90

MRC-MARINE RESOURCES COMMISSION SHORELINE 1:5000
NSHL-1989 SHORELINE FROM AERIAL PHOTOGRAPHY 1:7200
SED-SEDIMENT INVENTORY STATIONS 1:24000
STRUCTS-SHORELINE STABILIZATION STRUCTURES 1:7200