

Reports

1989

The Assessment of Commercial Fishing Effort in Virginia Annual Report 1989

Joice S. Davis
Virginia Institute of Marine Science

James C. Owens
Virginia Institute of Marine Science

Joseph G. Loesch
Virginia Institute of Marine Science

Follow this and additional works at: <https://scholarworks.wm.edu/reports>

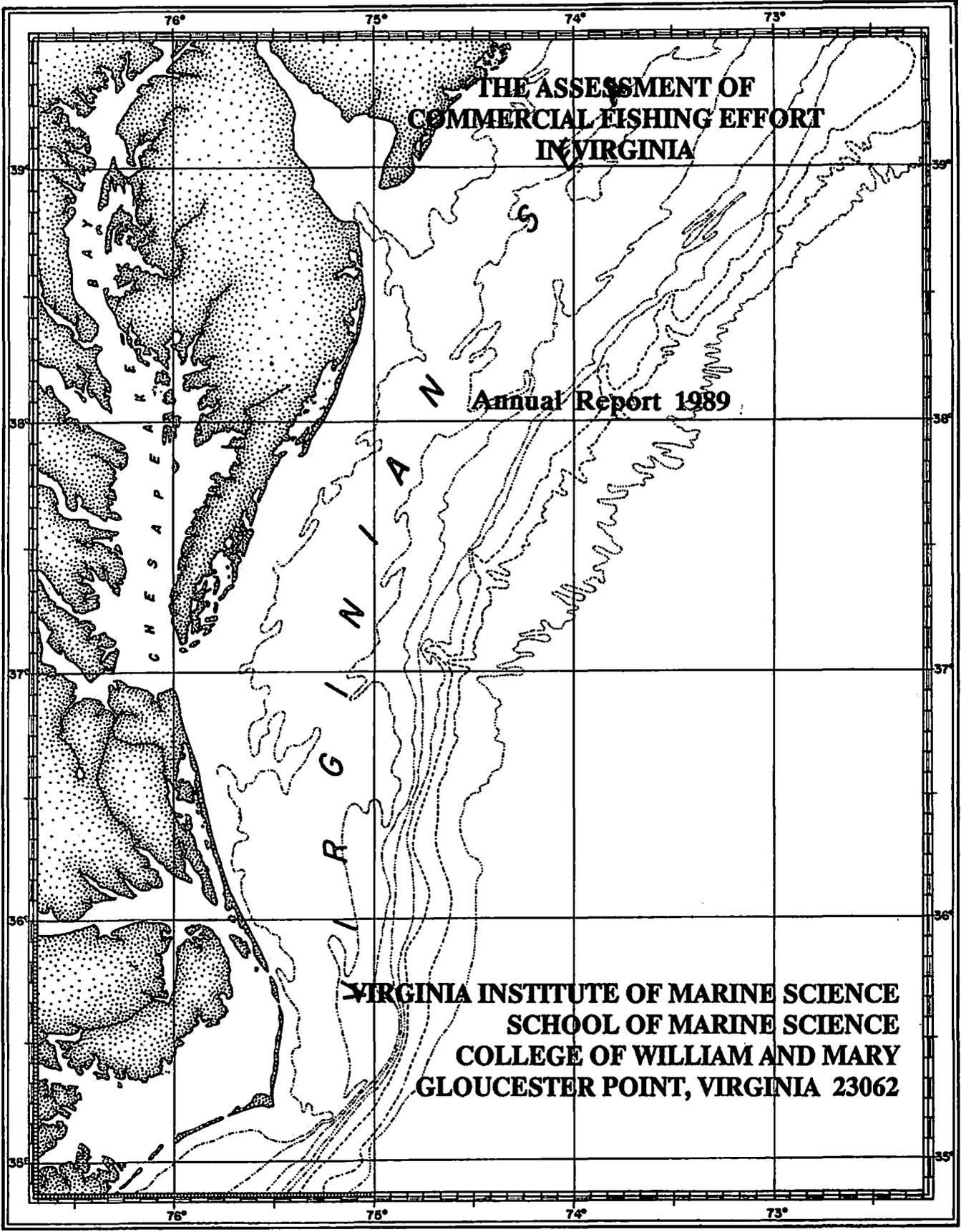


Part of the [Aquaculture and Fisheries Commons](#)

Recommended Citation

Davis, J. S., Owens, J. C., & Loesch, J. G. (1989) The Assessment of Commercial Fishing Effort in Virginia Annual Report 1989. Virginia Institute of Marine Science, William & Mary. <https://scholarworks.wm.edu/reports/2756>

This Report is brought to you for free and open access by W&M ScholarWorks. It has been accepted for inclusion in Reports by an authorized administrator of W&M ScholarWorks. For more information, please contact scholarworks@wm.edu.



**THE ASSESSMENT OF
COMMERCIAL FISHING EFFORT
IN VIRGINIA**

Annual Report 1989

**VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE
COLLEGE OF WILLIAM AND MARY
GLOUCESTER POINT, VIRGINIA 23062**

VIMS
SH
35
V8 A8 7
1989

The Assessment of Commercial Fishing Effort in Virginia

Annual Report 1989

Prepared by

Joice S. Davis, James C. Owens and Joseph G. Loesch

of the

Virginia Institute of Marine Science

School of Marine Science

College of William and Mary

Gloucester Point, Virginia 23062

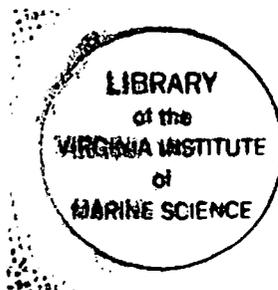


TABLE OF CONTENTS

	Page
Acknowledgments.	iv
List of Tables	v
Summary.	x
Introduction	1
Methods.	2
Pound nets	2
Stake gill nets.	3
Anchor and drift gill nets	3
Fyke nets.	4
Haul seines.	4
Results.	5
Pound nets	5
Chesapeake Bay areas	5
Stake gill nets.	5
James River.	5
York River	6
Rappahannock River	6
Anchor gill nets	7
James River.	7
York River	8
Rappahannock River	8
Drift gill nets.	8
Fyke nets.	9
Haul seines.	9
Mullet nets.	9
Data Comparison Between Years	10
Discussion	10
Pound nets	12
Chesapeake Bay	12
James River.	13
York River	13
Rappahannock River	14
Stake gill nets.	14

TABLE OF CONTENTS

	Page
Anchor gill nets	15
Drift gill nets.	16
Fyke nets.	17
Haul seines.	17
Date Comparison Between Years.	17
Recommendations.	18
Literature Cited	21
Appendix I	55
Appendix II.	57

ACKNOWLEDGMENTS

We express our sincere thanks to the many commercial watermen who generously gave us information about their fishing gear and shared their knowledge of the saltwater fisheries of Virginia. We also thank the seafood dealers who answered our questions about the complexities of food fish marketing.

We are also indebted to the following Virginia Institute of Marine Science personnel: Dianne Bowers, who prepared the art work, Connie Darouse and Sandy Ring who typed the manuscript, and Sam White, pilot of the VIMS plane.

The project was funded by the Virginia Marine Resources Commission.

LIST OF TABLES

	Page
Table 1. Number of active pound nets counted by aerial survey and telephone canvass in the Chesapeake Bay, Potomac River and its Virginia tributaries, and major Virginia tributaries for the period 1 October-30 June 1989, by VMRC water body codes.	22
Table 2. Maximum number of pound nets in operation by season, by VMRC water body codes, from Fall 1987 through Spring 1989.	23
Table 3. Pound net effort in Chesapeake Bay, Western Management Area, subarea 011, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	24
Table 4. Pound net effort in Chesapeake Bay, Upper Western Section, subarea 111, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	25
Table 5. Pound net effort in Chesapeake Bay, Windmill Point - New Point, subarea 511, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	26
Table 6. Pound net effort in Chesapeake Bay, York Spit, subarea 611, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	27
Table 7. Pound net effort in Chesapeake Bay, Tue Marsh - Old Point, subarea 711, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	28

	Page
Table 8. Pound net effort in Chesapeake Bay, Willoughby Spit - Cape Henry, subarea 811, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	29
Table 9. Pound net effort in Chesapeake Bay, Lower Eastern Section subarea 411, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	30
Table 10. Pound net effort in Chesapeake Bay, Upper Eastern Section, subarea 211, for the contract period 1988 and 1989. Data report by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	31
Table 11. Pound net effort in Chesapeake Bay, Tangier Sound, subarea 084, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	32
Table 12. Pound net effort in James River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	33
Table 13. Pound net effort in York River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	34
Table 14. Pound net effort in Rappahannock River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	35

	Page
Table 15. Pound net effort in Potomac River, for the contract period 1988 and 1989. Data reported by half-month, mean net day per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass	36
Table 16. Pound net effort in Back River, subarea 003, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	37
Table 17. Pound net effort in Moback Bay, subarea 055, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	38
Table 18. Pound net effort in Piankatank River, subarea 069, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	39
Table 19. Pound net effort in Chesapeake Bay, subarea 027, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	40
Table 20. Pound net effort in Potomac Creek, subarea 074, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	41
Table 21. Pound net effort in Yeocomico River, subarea 093, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	42

	Page
Table 22. Pound net effort in Coan River, subarea 017, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.	43
Table 23. Maximum number of active stake gill net stands and estimated linear feet of net in the James River, reported by VMRC Subarea, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews.	44
Table 24. Maximum number of active stake gill net stands and estimated linear feet of net in the York River, reported by VMRC subareas, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews.	45
Table 25. Maximum number of active stake gill net stands and estimated linear feet of net in the Rappahannock River, reported by VMRC subareas, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews	46
Table 26. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the James River, by VMRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews.	47
Table 27. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the York River, by VMRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews.	48
Table 28. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the Rappahannock River, by VMRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews	49

	Page
Table 29. Estimated drift gill net effort in James River, Upper Section (subarea 337), and two York River tributaries, the Pamunkey River (subarea 067), and the Mattaponi River (subarea 049), during the contract period 1 October 1988 - 30 June 1989*. Data reported as mean number of nets per month, mean length of each net, and estimated linear feet of net available to the fishery per month. (Effort estimate by local commercial fishermen, personal communications)	50
Table 30. Contribution of fishing effort by fyke nets, by half-month in the James and York rivers, by subareas, 1 October - 30 June 1989. Effort derived from personal and telephone interviews with fishermen	51
Table 31. Contributions of fishing effort by haul seine, by half-month, in specific water areas in Virginia, 1 October 1988 - 30 June 1989. Effort derived from personal and telephone interviews with fishermen	52
Table 32. Commercial fishing effort assessment. Peak net counts, Fall 1988, and number of VMRC 1988 licenses issued. . . .	53
Table 33. Commercial fishing effort assessment. Peak net counts, Spring 1989, and number of VMRC licenses issued January through May 1989.	54

Summary

1. Pound nets were counted by aerial survey and/or telephone canvass. A maximum of 166 actively fishing nets was counted in the second half of May 1989.
2. Stake gill net effort was assessed by personal interviews and gill net counts. Peak activity occurred in March and April.
3. James River anchor gill nets were more numerous in Fall 1988 than in Spring 1989, whereas in the York and Rappahannock rivers the Spring fishing effort exceeded the Fall fishing effort.
4. Drift gill nets were fished in the upper reaches of the James, Pamunkey and Mattaponi rivers. The recreational fishery exceeded the commercial fishery.
5. The most extensive fyke net fishery was located in the upper James River and the most extensive haul seine fishery was located in the York River, followed closely by the Poquoson Flats fishery.
6. Recommendations for the enhancement of gear assessment data are:
 - a. Increase technician time in order to expand the scope of personal and telephone interviews.
 - b. Increase aerial surveillance in order to adequately assess the expanding pound net fishery in the James and Potomac rivers.
 - c. Document stationary pound nets and fyke net locations by use of LORAN.
 - d. Require descriptors on VMRC license so as to discriminate between large, visible fyke nets and small submerged fyke nets.
 - e. Require on VMRC license application, a definition of gill net status, i.e., commercial full-time, commercial part-time, or recreational.
 - f. Require on VMRC license application a definition of intended fishing location and expected usage of gill nets.

The Assessment of Commercial Fishing Effort in Virginia

INTRODUCTION

This report summarizes an assessment of commercial fishing effort in the Chesapeake Bay and its Virginia tributaries during the period 1 October 1988 through 30 June 1989. Objectives of the study were: 1) to assess pound net fishing effort in Chesapeake Bay, in the James, York, Rappahannock, and Potomac rivers, and the Virginia tributaries to the Potomac River; and 2) to assess stake, anchor and drift gill net fishing effort in the James, York and Rappahannock rivers.

The study period began on 1 October 1988 and ended on 30 June 1989. Data for fyke net, haul seine and mullet net fisheries, when available, have also been included.

Appendices to this report are a Virginia Marine Resources Commission (VMRC) map of Virginia water body designations, and corresponding water codes, two of which we have modified slightly, and a maps of the Chesapeake Bay and major rivers, including the Potomac River, showing pound net sites that were occupied during the study period.

Two quarterly reports have been made to VMRC containing preliminary gear assessment data. Those data have been upgraded where necessary and are included in this report.

METHODS

Pound Nets

Actively fishing pound nets were counted by an observer during monthly aerial surveys at low altitudes during December 1988 and January 1989. A planned flight in February never materialized. Two flights per month were planned during October and November 1988, and March through June 1989 to count pound nets. A pound net is deemed to be actively fishing when all of its parts, the hedging (lead), heart, and head, are in place. In addition to the aerial surveys, some pound net fishermen were canvassed by telephone calls and/or letters of inquiry on the north side of Potomac River, Lower Section (subarea 175), Lower Central Section (subarea 275) and Potomac River where air space is restricted or in areas where calls or letters were more economically feasible. James River, Upper Section (subarea 337), Potomac River, Upper Central Section (subarea 375), Pocomoke Sound (subarea 072) and seaside Eastern Shore (subarea 097) were aerially surveyed as often as necessary to upgrade data if insufficient data were collected by telephone calls.

We have identified areas where pound nets are located in Chesapeake Bay and its tributaries, using VMRC-designated codes and names of Virginia water bodies (Appendix I), and further divided and numbered two VMRC water areas along the western side of Chesapeake Bay, using VIMS historical aerial pound net survey designations, which are more definitive. Data are presented in tabular form by water body, showing the number of pound nets fishing in each sampling period, the mean number of net-days per day, and the number of net-days per month.

Stake Gill Nets

Stake gill net effort in the James and York rivers was assessed by observers in small boats during the first half of April, near the peak of the American shad (Alosa sapidissima) gill net fishing season using a separate source of funding. Each active stand was counted, the number of sections per stand and the approximate length of each section in the stand was recorded. We believe the personal interviews and telephone contacts we made with fishermen on these rivers, along with the gill net counts, yielded reliable numbers.

Personal interviews with Rappahannock River gill net fishermen were utilized to ascertain maximum stake gill net activity in Spring 1989. Telephone contact with fishermen continued on a semi-weekly to weekly basis, depending on fishing intensity, in each half month throughout the duration of the contract period. This method was a reliable way to determine fishing effort by the various gears employed in these rivers. Effort data are reported as the maximum number of active stands and total linear feet of net fished per half-month.

Anchor and Drift Gill Nets

Personal interviews and telephone calls were employed to assess the anchor and drift gill fisheries in the three major Virginia tributaries to the Chesapeake Bay. These types of gear, particularly drift gill nets, are generally a one-man operation, are very mobile, can easily be moved from one water body to another, are fished by commercial fishermen and recreational fishermen alike, and therefore, are probably the most under-reported types of gear licensed by the State of Virginia. We have included the recreational as well as the commercial aspect of these fisheries. Effort data for anchor gill

nets are shown as the maximum number of nets and linear feet of nets fished per half month. Effort data for drift gill nets are shown as mean number of nets per month, mean length of nets and estimated linear feet of net per month.

Fyke Nets

Data for fyke nets were collected through personal interviews with commercial fishermen. The major fyke net fishery is located on the upper James River. We also obtained data on one fyke net in the lower York River and one in the upper section. Data are presented as units of gear by half month, mean number of net days per day, and the number of net days per month.

Haul Seines

Data for haul seines were collected through personal interviews with commercial fishermen. This type of gear was utilized in the James and York rivers, Subarea 711, and Mobjack Bay. Data are presented as units of gear, by half-month.

RESULTS

Pound Nets

Chesapeake Bay Areas

Pound net data for Chesapeake Bay, its Virginia tributaries, and the Potomac River, are given in Tables 1 through 22 using VMRC-designated subarea codes, except where such subareas were further divided to more closely match the VIMS historical aerial pound net survey designations (see Appendix I, subareas 111, 311). Dates of aerial surveys and the number of active pound nets observed for the contract period are shown in Table 1. Table 2 shows the maximum number of pound nets, by subarea code, in Fall 1987 and Fall 1988, and Spring 1988 and Spring 1989, for comparison of two seasons in two consecutive years. Details of preliminary pound net data for the period 1 October - 31 December 1988 were reported in the second quarterly report in Tables 8 through 27 (Davis et al. 1989). These tables have been expanded to include data covering the remainder of the contract period, in Tables 3 through 25.

Stake Gill Nets

James River

The earliest stake gill net activity in the James River for the contract period was reported in February 1989 in subarea 237, Central Section. Two stands were in the river during early February. These remained through late

February and early March and four additional stands were in place by late March. Subarea 137, Lower Section, had four stake gill net stands in place by early March, and they remained through the second half of April (Table 23). These stake gill nets were primarily set for American shad (Alosa sapidissima).

York River

The York River had the most extensive stake gill net fishery of the three major Virginia tributaries. However, the fishery was limited to the two uppermost sections of the river.

Stake gill nets were in place in both the Central and Upper sections (subareas 295 and 395, respectively) in the first half of November 1988 and were removed from the central section after November. The VMRC regulation banning the taking of striped bass (Morone saxatilis) (1 December - 31 May) discouraged fishing effort until the Spring fishing season began. The peak of the stake gill net fishery occurred in the first half of April (Table 24).

Rappahannock River

All stake gill nets on the Rappahannock River were located in the Central Section, subarea 277, except for two nets that were fished in March 1989 in the Upper Section, subarea 377, for white perch (Morone Americana). Two stands were already in place in subarea 277 in the first half of October 1988. The count increased to eight stands by the first half of January 1989. These remained fishing through April. Those that were located in the striped bass spawning zone above Mile 37 were removed by 30 April. All nets were removed

by 31 May. The total number of stands and estimated linear feet, by half-month, are shown in Table 25.

Anchor Gill Nets

Maximum numbers of nets per half-month and total linear feet of netting were assessed for all subareas of the James, York and Rappahannock rivers (Tables 26-28).

Mobjack Bay (subarea 055) and Chesapeake Bay both had anchor gill net fisheries. An estimation of 150 nets in the Chesapeake and 18 nets in the Mobjack was made by commercial watermen who were familiar with the fisheries in particular areas (Personal communication).

James River

In the Fall 1988 fishery in subarea 137, the largest number of nets occurred in the last half of November; in subarea 237, the second half of October; and in subarea 337, the second half of November (Table 26). The Spring 1989 anchor gill net fishery was not as extensive as the Fall fishery. Subarea 137 had a maximum of 10 nets in March, subarea 237 had a maximum of 22 nets in late February, and subarea 337 had a maximum of six nets in March (Table 26).

York River

The anchor gill net fishery in the York River was more extensive in subarea 195, Lower Section, in Fall 1988 than in any other subarea, with 41 nets in the first half of October, which decreased to zero by the second half of December (Table 27). It was also the most heavily exploited subarea in Spring 1989. Two stands were set in late February and a peak of 59 stands was reached in late May.

Rappahannock River

The Rappahannock River had an active commercial anchor gill net fishery throughout the contract period. Subarea 277 (Central Section) was the most heavily exploited of the three subareas (Table 28). Upriver nets (subarea 377) averaged about 325 linear feet per net in length, compared to an average length of 900 feet for downriver nets (subarea 177).

Drift Gill Nets

The drift gill net fisheries for American shad and river herring (Alosa sp.) in the upper portions of the James, Pamunkey and Mattaponi rivers were assessed for the contract period (Table 29). In addition to the three rivers mentioned above, the Rappahannock River supported a minimal recreational, or part-time, fishery (personal communication).

Fyke Nets

Fyke nets in the upper section of the James River (subarea 337) were set to fish during the entire contract period except the early part of January and the last half of June (Table 30). One fyke net in the lower York (subarea 195) was fishing during the Fall 1988, in April and late June of 1989, and one, set in early June in subarea 395, was still fishing at contract end.

Haul Seines

The haul seine fishery was assessed during Fall 1988 and Spring 1989 (Table 31). One unit was operated in the lower James (subarea 137) in November 1988. Each section of the James River had haul seine activity beginning in March 1989 and continuing through the end of the contract period. The York River haul seine season began in late April 1989, reached a peak of seven units in early June in subarea 195, and a peak of two units in late May in subarea 295. Subarea 711, Tue Marsh to Old Point Comfort, had four units working in late May 1989 through the end of the contract period. Mobjack Bay (subarea 055) also had a haul seine fishery in late April - early May, with three units working.

Mullet Nets

In addition to the above mentioned gear types, there was a striped mullet (Mugil cephalus) or "jumper" fishery in York River during late June. Four units were counted in subarea 195, and one unit was counted in the Central Section, subarea 295.

Data Comparison Between Years

The number of food fish licenses issued by VMRC in 1988 exceeded those sold in 1989 (VMRC Gear License data for 1989 are preliminary) (Tables 32 and 33). Also included in these tables are peak counts, by gear, by river, for the two seasons represented in the contract period.

DISCUSSION

Preliminary 1989 gear license data from VMRC indicate that food fish gear licenses sold in 1988 exceeded the sale of these licenses in 1989 by 27.6% (Tables 32, 33). VMRC sold 183 pound net licenses in 1988 and 146 in 1989 (preliminary data), a decrease of 20%. The peak count of active nets (142) , including Potomac River nets, in the first five months of 1988 was 142 active nets, recorded in the second half of May (Blumberg and Loesch 1988). In the first five months of 1989 the peak number of active nets(166) also occurred in the second half of May. Fifteen of these nets were located in Potomac Creek, a small Virginia tributary to the Potomac River, and accounted for the major portion of the increase in numbers in May 1989. The nets were set primarily to capture catfish, scrap or bait for crab pots and eel pots (personal communication).

The number of units of the various types of fishing gear in the Chesapeake Bay and its tributaries changes greatly during the course of a year, and reflects the commercial watermen's knowledge and experience concerning the seasonal fisheries. Migratory patterns and cyclic appearances of desirable, or marketable, species affect seasonal availability. Market demands, both foreign and domestic, tend to affect and influence the

fishermen's choice of gear and net sizes, as do the economics of setting large, stationary traps or using small, mobile types of gear. Fishery regulations, resulting from depletion of, or reduction in stocks, (i.e., flounder, striped bass), and pollution (i.e., Kepone contamination of the James River) are also contributory factors in the fishermen's choice of location, gear, and net sizes. Fluctuations in numbers of actively fishing gear are influenced by seasonal hydrological conditions, such as winter storms, droughts, flooding, and hurricanes.

Diversification has become the key that allows the self-employed fisherman to stay in business. Most fishermen are prepared to vary their methods of capture according to the type of seafood available. For example, it is not unusual for a crab or eel potter to pull his pots and set anchor gill nets when food fish are bountiful and dock-side prices are good. In today's mobile society a gill net fishermen or crabber may move his gear from one river to another or even outside the Bay if economics demanded it.

Commercial fishermen reported a good shad season on all three major Virginia rivers in Spring 1989. However, catches of summer species such as blue fish (Pomatomus saltatrix), weakfish (Cynoscion regalis), spot (Leiostomus xanthurus), and croaker (Micropogonias undulatus) have not been as plentiful in 1989 as they have been in recent years in the Bay, according to seafood dealers.

Pound Nets

Chesapeake Bay

Pound nets in Chesapeake Bay tend to be clustered in certain areas. The choice of locations is influenced by: 1) accessibility to home ports; 2) location of docking facilities and/or seafood handling facilities; 3) good launching sites; 4) areas of sufficient size for net maintenance, pole preparation and storage; 5) family fishing traditions and 6) fish migratory patterns. Pound net sites occupied in 1988 and 1989 are indicated in Appendix II.

Pound nets located in the Chesapeake Bay (Western Management Area) and the area from Windmill Point on the Rappahannock River to New Point capture edible species that are sold to local markets and are trucked to city markets. Fishes that have little or no demand in the marketplace are referred to as "scrap." These catches are sold locally as crab bait or trucked to processing plants in Reedville, Virginia.

The York Spit area (subarea 611) is a productive fishing area and pound nets located there are set primarily for the summer and fall fisheries. Croaker, spot, bluefish, grey trout, summer flounder (Paralichthys dentatus) and Atlantic menhaden (Brevoortia tyrannus) are some of the species caught. Historically, pound nets in the Tue Marsh-Old Point areas (subarea 711) are fished primarily for river herring (Alosa aestivalis and A. pseudoharengus), American shad, and spot and other summer species.

The five pound net sites in the Cape Henry area located along the shore to the east of Lynnhaven Inlet are usually set to catch the early arriving anadromous species, river herring and shad, and subsequent summer species.

The numerous pound net sites in Chesapeake Bay (Lower Eastern Section, subarea 411), for the most part, lie very close inshore, and the majority of them are found from Cape Charles south. They usually remain set through the Fall season when marketable summer species migrate out of the Bay.

James River

The James River pound net fishery has been affected by a VMRC ban on fishing since 1975 because of Kepone contamination of the river. This restriction and the high cost of setting pound nets virtually eliminated this fishery from the James until late 1986 when a gizzard shad (Dorosoma cepedianum) fishery developed in the upper section (subarea 337) of the James above the Kepone-contaminated area. One fisherman set three pound nets in early 1989 in the upper section in order to fulfill market demands for this species. The ban imposed on finfish harvest because of Kepone was lifted in July 1988. One pound net observed in the lower section (subarea 137) in May was later observed damaged and apparently not fishing. It is to be expected that the fishing industry will continue its growth in the James River, however, it might be years before it regains its former magnitude.

York River

Fish caught in pound nets in the Lower Section (subarea 195) of the York River are landed nearby and are sold to wholesale buyers, shipped to retail markets, or used locally as crab bait. Some nets were in place in early March, as soon as threat of winter storm damage was past.

Rappahannock River

Pound nets in the Rappahannock River, Lower Section (subarea 177), were in place by early April, set to catch the river herring, Menhaden and shad entering the river. In the Central Section (subarea 277) near Morattico, one net was set in early March. In the Upper Section from mile 35 to mile 60, the nets were set later (late April) and catches included catfish (Ictalurus sp.), white perch and the anadromous fishes. Retail and wholesale markets are the destinations of the edible catch and bait is sold to crab and eel pot fishermen (Davis et al. 1987). The pound net fishery was delayed by several weeks in Spring 1989 due to bad weather.

Stake Gill Nets

Generally, the stake gill net fisheries in the James, York, and Rappahannock rivers begin in the Spring when ice in the rivers is no longer a threat to poles and nets. The York River system has the most extensive stake gill net fishery in Virginia. In the James and York rivers the stake gill net season begins with the arrival of the American shad. Mesh sizes range from 4 7/8-inch to 5-inch stretched mesh, which would select the larger, more desirable roe shad entering the river to spawn. Fishing restrictions due to Kepone contamination of the James river were lifted on 1 July 1988. However, the VMRC regulation banning the removal of striped bass from Virginia waters (1 December - 31 May) had an adverse impact on fishing effort in all rivers until the Spring season began. White perch are the target species in the Rappahannock River in February and March before the arrival of American shad.

Stake gill nets are subject to fouling by marine organisms, grass, and other detritus. These conditions affect catch and occasionally the nets must be raised and cleaned. The nets are removed when shad are scarce or dockside prices are low. Other fisheries (haul seine, anchor gill net, crab pot, etc.) replace the stake gill net fishery. White perch and catfish are the target species through the late Fall and Winter months. According to personal interviews with local fishermen on the York River system and their catch records which we obtained for another study, the Spring American shad fishery has apparently been the best one in four or five years, and the shad have brought better prices.

Anchor Gill Nets

The temporal and spatial aspects of the anchor gill net fisheries in Virginia were discussed in detail by Davis et. al. (1986).

In general, effort in the James and York rivers in 1988-89 surpassed that reported in 1987 (Davis et al. 1987), whereas a decrease of effort was noted in the Rappahannock River in 1989.

Drift Gill Nets

Drift gill nets are usually employed in the upper portions of rivers. They are readily fished from small boats, and target species have traditionally been the anadromous fishes on their spawning runs in the James, York, and Rappahannock rivers. Drift gill nets are generally fished about 4 hours at a time, and at the peak of the spawning runs they are usually fished on one tide each day, either early morning or late evening. Commercial fishermen will sometimes drift nets on both tides. The nets do not generally catch as well during daylight hours, probably due to water clarity and an avoidance reaction by the fish to the nets. The Mattaponi and Pamunkey rivers support large recreational drift gill net fisheries during American shad spawning season (early April to late May) according to interviews with commercial fishermen. People from surrounding areas who know the rivers and their productivity have been known to spend their vacations fishing for shad, generally one to two weeks.

The James and Rappahannock rivers support similar recreational fisheries, but they are probably not as extensive as the Mattaponi and Pamunkey fisheries. It is likely that we have under-estimated the true magnitude of the recreational fishery, particularly in a good season like Spring 1989 on the York system. Limited information about this fishery is due, in part, to the size of the area to be canvassed (four tributaries), number of VMRC gill net licenses sold (potential fishermen), mobile nature of the gear, and length of season.

Fyke Nets

The fishing style of this type of non-selective gear, utilized mainly by commercial fishermen in the upper James River, was discussed in Davis et al. (1986). Maximum effort on the James in 1988-89 exceeded that in 1987 with 26 nets reported for the year. Two units on the York were fished, one in the Fall 1988 and the other in June 1989.

Haul Seines

General areas utilized and seasonal activity of this non-selective gear was discussed in Davis et al. (1986). The York River was the area of heaviest exploitation with nine haul seine units in operation in 1989. Mobjack Bay had a fishery of three units in 1989. One haul seiner operated in the James River in Fall 1988, one less than in 1987; however, 4 units were operated in the river in Spring 1989. Four units were working out of Poquoson (subarea 711) in May and June 1989. On the Rappahannock River no haul seine units were reported in operation.

Data Comparison Between Years

VMRC license data in Tables 32 and 33 indicate that more food fish licenses are issued than gears fished. Therefore, in using gear licenses as a measurement of effort in Virginia waters, effort will be over-estimated.

RECOMMENDATIONS

Fishing effort data play an important part in the formulation of management plans of the fisheries of Virginia, and are usually cited when attempts are made to explain changes in a fishery's catch or calculate catch-per-unit-effort (CPUE) statistics.

Our methods of data acquisition, aerial pound net counts, personal interviews and telephone conversations with commercial watermen and seafood dealers, yielded pertinent data concerning Virginia fisheries. In future assessment studies we recommend devoting additional technician time in order to expand personal contacts and telephone interviews with fishermen and seafood dealers and thereby enhancing the data base.

In the past each aerial pound net survey was accomplished in one day unless bad weather or other circumstances beyond our control forced a change of plans. An additional pound net fishery developed in late 1986 in the upper James River above Hopewell. This was the first pound net activity reported in this section since the river was closed to fishing in 1975 due to Kepone contamination. This upriver area, as well as the upper York and upper Potomac, would be more adequately assessed if the aerial survey were divided in two segments in each half-month.

The locations of stationary fishing devices such as pound nets and fyke nets are generally licensed for the same positions year after year, and could be identified and documented by the use of LORAN, a navigational aid. Such documentation would enable VMRC district inspectors to more accurately locate pound nets for future licensing. It may also prove useful as an aid in arbitration concerning disputes over net locations. We have considered using the VIMS plane to document the locations of pound nets. However, it has not

been accomplished to date. Additional in-flight time per day during regular aerial pound net surveys was considered an extra hazard because of excessive pilot fatigue and fuel requirements of the plane. Mapping flights would be advisable, pending availability of plane, and personnel time. An alternative would be to have VMRC district inspectors or their personnel document the location of each pound net and fyke net when the license is issued, by the use of LORAN, which is available on most VMRC vessels.

There is a large discrepancy in the number of fyke net licenses sold by VMRC and the number of actual fyke net sites accounted for. We believe part of the discrepancy is that two types of fyke nets are used. One is set in the configuration of a pound net, with the hedging, heart and hoops (head) visible. The other is much smaller, and is generally totally submerged, with no hedging or heart visible. The smaller fyke is used in narrow, upriver creeks and waterways to catch catfish and other bottom feeding species. We recommend that the fyke net type be specified on the license.

Prior to 1989, VMRC made no distinction between a drift gill net and an anchored gill net as they are sold under the same heading "Gill Net License." The drift net and anchored net differ, in that they are: generally targeting different species, are fished in different salinity regimes, and in different depths in relation to the water column; therefore, data collected from the two different types of gear are not compatible. We therefore recommended that anchored gill nets and drift gill nets be licensed separately. Additionally, we again recommend a further subdivision of anchored gill nets and suggest that, at the time the gill net license is issued, the VMRC licensing agent could request information that would detail: 1) the expected use of the license (commercial full-time or part-time; or recreational); 2) and the fishing location, and 3) amount of expected usage of the gill nets licensed.

This information would then be computerized at VMRC along with other gear licensing data.

In recent years there has been an increase in noncommercial use of anchored gill nets, and such landings may be considerable but have never been introduced into commercial landings statistics. Such landings, however, should be included in the total harvest from Virginia waters. This could be accomplished by telephone or "post card" interviews, or a system of mandatory reporting of catch by all fishermen, commercial and recreational.

LITERATURE CITED

Blumberg, L., and J. G. Loesch. 1988. Study of Alosa stock composition and year-class strength in Virginia. Annu. Rep. 1988. Nat. Mar. Fish. Serv., Proj. No. AFC 20-2. Virginia Institute of Marine Science, Gloucester Point, Virginia. 28P.

Davis, J. S., J. C. Owens, W. H. Kriete, Jr., and J. G. Loesch. 1986. The assessment of commercial fishing effort in Virginia. Annu. Rep. 1986. Virginia Institute of Marine Science, Gloucester Point, Virginia. 77p.

Davis, J. S., J. C. Owens, and J. G. Loesch. 1987. The assessment of commercial fishing effort in Virginia. Annu. Rep. 1987. Virginia Institute of Marine Science, Gloucester Point, Virginia. 54p.

Davis, J. S., J. C. Owens, and J. G. Loesch. 1989. The assessment of commercial fishing effort in Virginia. Second Quarterly Rep. January 1-March 31, 1989. Virginia Institute of Marine Science, Gloucester Point, Virginia. 33p.

Table 1. Number of active pound nets counted by aerial survey and telephone canvass in the Chesapeake Bay, Potomac River and its Virginia tributaries, and major Virginia tributaries for the period 1 October - 30 June 1989, by VMRC water body codes.

VMRC Code	Oct. 14/17	Oct. 26	Nov. 10	Nov. 29	Dec. 14	Jan. 27	Mar. 10	30 Mar. /4 Apr.	Apr. 12	Apr. 24	May 4	May 19	Jun. 14	Jun. 28
003	0	0	0	0	0	N.S.	0	0	0	0	0	1	1	N.S.
011	8	9	9	5	2	0	0	5	7	8	8	8	10	9
111*	0	0	0	0	0	0	0	0	0	0	1	1	1	1
511	9	9	9	2	2	0	2	5	6	11	13	13	13	13
611	3	2	1	0	0	0	0	0	0	0	2	3	3	3
211	4	4	4	0	0	0	0	0	0	0	0	0	1	2
311*														
711	0	0	0	0	0	0	0	0	0	0	0	1	1	1
811	5	5	3	0	0	0	0	4	4	4	5	5	5	5
411	32	27	26	21	8	4	0	8	10	15	20	24	20	23
017	0	0	0	0	0	0	0	0	0	2	2	2	2	2
019	0	0	0	0	0	0	0	0	0	0	0	0	0	0
021	0	0	0	0	0	0	0	0	0	0	0	0	0	0
027	3	3	3	2	0	0	0	3	3	3	3	3	2	3
029	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	N.S.	N.S.	N.S.
237	0	0	0	0	0	0	0	0	0	0	1	N.S.	0	N.S.
337	0	0	0	0	0	2	3	3	0	0	0	0	0	0
043	0	0	0	0	0	0	0	0	0	0	0	0	0	0
050	0	0	0	0	0	0	0	0	0	0	0	0	0	0
055	1	1	1	1	1	0	0	0	0	1	1	1	1	1
059	0	0	0	0	0	0	0	0	0	0	0	0	0	0
069	1	1	1	0	0	0	1	1	1	1	1	0	1	1
072	0	0	0	0	0	0	0	0	0	0	0	0	0	N.S.
073	0	0	0	0	0	0	0	0	0	0	0	0	0	0
074	1	1	1	0	0	0	9	14	14	15	15	15	6	6
175	52	47	46	26	0	0	2	22	23	39	51	55	54	58
275	2	2	1	2	0	0	1	2	2	2	2	0	0	0
375	3	2	1	0	0	0	4	6	7	7	7	2	0	0
076	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	2	2	2	2	0	0	0	3	3	4	5	7	7	7
277	3	3	2	2	0	0	1	2	3	4	4	5	4	2
377	8	8	8	2	0	0	0	1	1	7	7	5	3	2
078	0	0	0	0	0	0	0	0	0	0	0	0	0	0
084	1	1	1	0	0	0	0	0	0	0	0	1	1	1
088	0	0	0	0	0	0	0	0	0	0	0	0	0	0
085	0	0	0	0	0	0	0	0	0	0	0	0	0	0
093	3	3	3	3	0	0	0	2	2	3	3	4	4	2
195	3	0	0	0	0	0	3	6	8	10	10	10	10	10
295	0	0	0	0	0	0	0	0	0	0	0	0	N.S.	0
395	1	1	0	0	0	0	0	0	0	0	0	0	N.S.	0
097	0	0	0	0	0	0	0	0	0	0	0	N.S.	N.S.	0
099	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	145	131	122	68	13	6	26	67	94	136	161	166	149	151

* - See Appendix I.

Table 2. Maximum number of pound nets in operation by season, by VMRC water body codes, from Fall 1987 through Spring 1989.

VMRC Subarea Code	Maximum Count		Maximum Count	
	Fall 1987	Fall 1988	Spring 1988	Spring 1989
003	0	0	0	1
011	5	9	7	10
111	0	0	1	1
511	9	9	10	13
611	6	3	3	3
211	3	4	2	2
711	2	0	1	1
811	5	5	5	5
411	27	32	29	24
017	0	0	0	2
027	3	3	2	3
237	0	0	0	1
337	4	0	6	3
055	1	1	2	1
069	1	1	1	1
074	1	1	2	15
175	43	52	48	55
275	3	2	4	2
375	0	3	8	7
177	1	2	6	7
277	3	3	4	5
377	10	8	8	7
084	3	1	1	1
093	0	3	1	4
195	2	3	12	10
395	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	132	146	163	184

Table 3. Pound net effort in Chesapeake Bay, Western Management Area, subarea 011, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar- 4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Western Management Area															
<u>Subarea 011</u>															
Aerial pound net count	8	9	9	5	2	0	0	5	7	8	8	8	10	9	
Mean net days/day	8.5		7		2			2.5		7.5		8		9.5	
Net days/month	263.5		210		62			77.5		225		248		285	
	Total net days = 535.5						Total net days = 835.5								
	Mean net days (Oct - Dec) = 178.5						Total net days (contract period) = 1,371								
							Mean net days (Jan - Jun) = 139.3 (Mar - Jun) = 208.9								
							Mean net days (contract period) = 152.3								

* - No flight in February.

Table 4. Pound net effort in Chesapeake Bay, Upper Western Section, subarea 111, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Upper Western Section															
<u>Subarea 111</u>															
Pound net count	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Mean net days/day												1		1	
Net days/month												31		30	

Total net days = 61

Total net days (contract period) = 61

Mean net days (Jan - Jun) = 10.2 (May - Jun) = 30.5

Mean net days (contract period) = 6.8

* - No flight in February.

Table 5. Pound net effort in Chesapeake Bay, Windmill Point - New Point, subarea 511, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 - 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Windmill Point - New Point															
<u>Subarea 511</u>															
Aerial pound net count	9	9	9	2	2	0		2	5	6	11	13	13	13	13
Mean net days/day	9		5.5	2				3.5		8.5		13		13	
Net days/month	279		165	62				108.5		255		403		390	
	Total net days = 506						Total net days = 1,156.5								
	Total net days (contract period) = 1,662.5														
	Mean net days (Oct - Dec) = 168.7						Mean net days (Jan - Jun) = 192.8 (Mar - Jun) = 289.1								
	Mean net days (contract period) = 184.7														

* - No flight in February.

Table 6. Pound net effort in Chesapeake Bay, York Spit, subarea 611, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
York Spit															
<u>Subarea 611</u>															
Aerial pound net count	3	2	1	0	0	0		0	0	0	0	2	3	3	3
Mean net days/day	2.5		0.5									2.5		3	
Net days/month	77.5		15.0									77.5		90	
Total net days = 92.5							Total net days = 167.5								
Total net days (contract period) = 260															
Mean net days (Oct - Nov) = 46.3 Including Dec. = 30.8							Mean net days (Jan - Jun) = 27.9 (May - Jun) = 83.8								
Mean net days (contract period) = 28.9															

* - No flight in February.

Table 7. Pound net effort in Chesapeake Bay, Tue Marsh - Old Point, subarea 711, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988							1989							
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Tue Marsh - Old Point															
<u>Subarea 711</u>															
Aerial pound net count	0	0	0	0	0	0		0	0	0	0	1	1	1	
Mean net days/day												0.5		1	
Net days/month												15.5		30	
Total net days = 45.5															
Total net days (contract period) = 45.5															
Mean net days (Jan - Jun) = 7.6 (May - Jun) = 22.8															
Mean net days (contract period) = 5.1															

* - No flight in February.

Table 8. Pound net effort in Chesapeake Bay, Willoughby Spit - Cape Henry, subarea 811, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Willoughby Spit- Cape Henry															
<u>Subarea 811</u>															
Aerial pound net count	5	5	5	0	0	0	0	4	4	4	5	5	5	5	5
Mean net days/day	5		2.5					2		4		5		5	
Net days/month	155		75					62		124		155		150	
Total net days = 230							Total net days = 491								
Total net days (contract period) = 721															
Mean net days (Oct - Dec) = 115 Including Dec. = 76.7							Mean net days (Jan - Jun) = 81.8 (Mar - Jun) = 122.8								
Mean net days (contract period) = 80.1															

* - No flight in February.

Table 9. Pound net effort in Chesapeake Bay, Lower Eastern Section, subarea 411, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar - 4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Lower Eastern Section															
<u>Subarea 411</u>															
Aerial pound net count	32	27	26	21	8	4	0	8	10	15	20	24	20	23	
Mean net days/day	29.5		23.5		8	4		4		12.5		22		21.5	
Net days/month	916.5		705		240	124		124		375		682		645	
Total net days = 1,859.5								Total net days = 1,950							
								Total net days (contract period) = 3,809.5							
Mean net days (Oct - Dec) = 619.8								Mean net days (Jan - Jun) = 325							
								Mean net days (contract period) = 423.3							

* - No flight in February.

Table 10. Pound net effort in Chesapeake Bay, Upper Eastern Section, subarea 211, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989									
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>	
Upper Eastern Section																
<u>Subarea 211</u>																
Aerial pound net count	4	4	4	0	0	0		0	0	0	0	0	0	1	2	
Mean net days/day	4		2												1.5	
Net days/month	124		60												45	
Total net days = 184							Total net days = 45									
	Total net day (contract period) = 229															
	Mean net days (Oct - Nov) = 92						Including Dec = 61.3						Mean net days (Jan - Jun) = 7.5			(Jun) = 45
	Mean net days (contract period) = 25.4															

* - No flight in February.

Table 11. Pound net effort in Chesapeake Bay, Tangier Sound, subarea 084, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989										
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>		
Tangier Sound																	
Subarea 084																	
Aerial pound net count	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1		
Mean net days/day		1		0.5									0.5		1		
Net days/month		31		15									15.5		30		
	Total net days = 46.0							Total net days = 45.5									
	Total net days (contract period) = 91.5																
	Mean net days (Oct - Nov) = 23							Including Dec = 15.3			Mean net days (Jan - Jun) = 7.6					(May - Jun) = 22.75	
	Mean net days (contract period) = 10.2																

* - No flight in February.



Table 12. Pound net effort in James River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988							1989							
	14 & 17 Oct	26 Oct	10 Nov	29 Nov	14 Dec	27 Jan	Feb*	10 Mar	30 Mar-4 Apr	12 Apr	24 Apr	4 May	19 May	14 Jun	28 Jun
Central Section															
<u>Subarea 237</u>															
Aerial pound net count	0	0	0	0	0	0		0	0	0	0	1	0	0	0
Mean net days/day												0.5			
Net days/month												15.5			
Total net days = 0								Total net days = 15.5							
								Total net days (contract period) = 15.5							
Mean net days = 0								Mean net days (Jan - Jun) = 2.6 (May) = 15.5							
								Mean net days (contract period) = 1.7							
Upper Section															
<u>Subarea 337</u>															
Aerial pound net count	0	0	0	0	0	2		3	3	0	0	0	0	0	0
Mean net days/day						2		3							
Net days/month						62		93							
Total net days = 0								Total net days = 93							
								Total net days (contract period) = 93							
Mean net days = 0								Mean net days (Jan - Jun) = 15.5 (Jan - Mar) = 31							
								Mean net days (contract period) = 10.3							

* - No flight in February.

Table 13. Pound net effort in York River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989										
	14 & 17 Oct	26 Oct	10 Nov	29 Nov	14 Dec	27 Jan	Feb*	10 Mar	30 Mar- 4 Apr	12 Apr	24 Apr	4 May	19 May	14 Jun	28 Jun		
Lower Section																	
<u>Subarea 195</u>																	
Aerial pound net count	3	0	0	0	0	0		3	6	8	10	10	10	11	10		
Mean net days/day	1.5						4.5								9	10	10.5
Net days/month	46.5						139.5								270	310	315
Total net days = 46.5								Total net days = 1,034.5									
Total net days (contract period) = 1,081																	
Mean net days (Oct) = 46.5 Including Nov & Dec = 15.5								Mean net days (Jan - Jun) = 172.4 (Mar - Jun) = 258.6									
Mean net days (contract period) = 120.1																	
Upper Section																	
<u>Subarea 395</u>																	
Pound net count	1	1	0	0	0	0		0	0	0	0	0	0	0	0		
Mean net days/day	1																
Net days/month	31																
Total net days = 31						Total net days = 0											
Total net days (contract period) = 31																	
Mean net days (Oct) = 31 Including Nov & Dec = 10.3						Mean net days (Jan - Jun) = 0											
Mean net days (contract period) = 3.4																	

* - No flight in February

Table 14. Pound net effort in Rappahannock River, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	14 & 17 Oct	26 Oct	10 Nov	29 Nov	14 Dec	27 Jan	Feb*	10 Mar	30 Mar- 4 Apr	12 Apr	24 Apr	4 May	19 May	14 Jun	28 Jun
Lower Section, Subarea 177															
Aerial pound net count	2	2	2	2	0	0	0	3	3	4	5	7	7	7	
Mean net days/day		2		2				1.5		3.5		6		7	
Net days/month		62		60				46.5		105		186		210	
Total net days = 122								Total net days = 547.5							
Total net days (contract period) = 669.5															
Mean net days (Oct - Nov) = 61 Including Dec = 40.7								Mean net days (Jan - Jun) = 91.3 (Mar - Jun) = 136.9							
Mean net days (contract period) = 74.4															
Central Section, Subarea 277															
Aerial pound net count	3	3	2	2	0	0	1	2	3	4	4	5	4	2	
Mean net days/day		3		2				1.5		3.5		4.5		3	
Net days/month		93		60				46.5		105		139.5		90	
Total net days = 153								Total net days = 381							
Total net days (contract period) = 534															
Mean net days (Oct - Nov) = 76.5 Including Dec = 51								Mean net days (Mar - Jun) = 63.5 (Mar - May) = 95.25							
Mean net days (contract period) = 59.3															
Upper Section, Subarea 377															
Aerial pound net count	8	8	8	2	0	0	0	1	1	7	7	5	3	2	
Mean net days/day		8		5				0.5		4		6		2.5	
Net days/month		248		150				15.5		120		186		75	
Total net days = 398								Total net days 396.5							
Total net days (contract period) = 794.5															
Mean net days (Oct - Nov) = 199 Including Dec = 132.6								Mean net days (Jan - Jun) = 66.1 (Mar - Jun) = 99.1							
Mean net days (contract period) = 88.3															

* - No flight in February.

Table 15. Pound net effort in Potosac River. for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988					1989									
	14 & 17 Oct	26 Oct	10 Nov	29 Nov	14 Dec	27 Jan	Feb*	10 Mar	30 Mar- 4 Apr	12 Apr	24 Apr	4 May	19 May	14 Jun	28 Jun
Lower Section, Subarea 175															
Aerial pound net count	52	47	46	26	0			2	22	23	39	51	55	54	58
Mean net days/day	49.5		36					12		31		53		56	
Net days/month	1,534.5		1,080					372		930		1,643		1,680	
Total net days = 2,614.5								Total net days = 4,625							
Total net days (contract period) = 7,239.5															
Mean net days (Oct - Nov) = 1307.3 Including Dec = 871.5								Mean net days (Jan - Jun) = 1,156.3							
Mean net days (contract period) = 804.4															
Lower Central Section, Subarea 275															
Aerial pound net count	2	2	1	2	0			1	2	2	2	2	0	0	0
Mean net days/day	2		1.5			0		1.5		2		1		0	
Net days/month	62		45					46.5		60		31		0	
Total net days = 107								Total net days = 137.5							
Total net days (contract period) = 244.5															
Mean net days (Oct - Nov) = 53.5 Including Dec = 35.7								Mean net days (Mar - Jun) = 34.4 (Mar - May) = 45.8							
Mean net days (contract period) = 27.2															
Upper Central Section, Subarea 375															
Aerial pound net count	3	2	1	0	0			4	6	7	7	7	2	0	0
Mean net days/day	2.5		.5					5		7		4.5		0	
Net days/month	77.5		15					155		210		139.5		0	
Total net days = 92.5								Total net days = 504.5							
Total net days (contract period) = 597															
Mean net days (Oct - Nov) = 46.25 Including Dec = 30.8								Mean net days (Jan - Jun) = 126.1 (Mar - Jun) = 168.2							
Mean net days (contract period) = 66.3															

* - No flight in February.

Table 16. Pound net effort in Back River, subarea 003, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Back River															
<u>Subarea 003</u>															
Aerial pound net count	0	0	0	0	0	0	0	0	0	0	0	1	1	1	
Mean net days/day												0.5		1	
Net days/month												15.5		30.0	
Total net days = 0							Total net days = 45.5								
							Total net days (contract period) = 45.5								
Mean net days = 0							Mean net days (Jan - Jun) = 7.6 (May - Jun) = 22.75								
							Mean net days (contract period) = 5.1								

* - No flight in February.

Table 17. Pound net effort in Mobjack Bay, subarea 055, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar- 4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Mobjack Bay															
<u>Subarea 055</u>															
Aerial pound net count	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1
Mean net days/day		1		1	1					0.5		1			1
Net days/month		31		30	31					15		31			30
	Total net days = 92							Total net days = 76							
	Total net days (contract period) = 168														
	Mean net days = 30.6							Mean net days (Jan - Jun) = 12.7 (Apr - Jun) = 25.3							
	Mean net days (contract period) = 18.7														

* - No flight in February.

Table 18. Pound net effort in Piankatank River, subarea 069, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Piankatank River															
<u>Subarea 069</u>															
Aerial pound net count	1	1	1	0	0	0		1	1	1	1	1	0	1	1
Mean net days/day		1		0.5					1		1		0.5		0.5
Net days/month		31		15					31		30		15.5		15
	Total net days = 46						Total net days = 137.5								
	Total net days (contract period) = 183.5														
	Mean net days (Oct - Nov) = 23 Including Dec = 15.3						Mean net days (Jan - Jun) = 22.9 (Mar - Jun) = 34.4								
	Mean net days (contract period) = 20.4														

* - No flight in February.

Table 19. Pound net effort in Chesapeake Bay, subarea 027, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar - 4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Fleets Bay															
<u>Subarea 027</u>															
Aerial pound net count	3	3	3	2	0	0	0	3	3	3	3	3	3	2	3
Mean net days/day		3		2.5				1.5		3		3			2.5
Net days/month		93		75				46.5		90		93			75
	Total net days = 168							Total net days = 304.5							
	Total net days (contract period) = 472.5														
	Mean net days (Oct - Nov) = 84						Including Dec = 56	Mean net days (Jan - Jun) = 50.8							(Mar - Jun) = 76.1
	Mean net days (contract period) = 52.5														

* - No flight in February.

Table 20. Pound net effort in Potomac Creek, subarea 074, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989										
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>		
Potomac Creek																	
<u>Subarea 074</u>																	
Aerial pound net count	1	1	1	0	0	0		9	14	14	15	15	15	6	6		
Mean net days/day		1		0.5					11.5		14.5		15		6		
Net days/month		31		15					356.5		435		465		180		
	Total net days = 46						Total net days = 1,436.5										
	Total net days (contract period) = 1,482.5																
	Mean net days (Oct - Nov) = 23						Including Dec = 15.3			Mean net days (Jan - Jun) = 239.4						(Mar - Jun) = 359.1	
	Mean net days (contract period) = 164.7																

* - No flight in February.

Table 21. Pound net effort in Yeoconico River, subarea 093, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988						1989								
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar-</u> <u>4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Yeoconico River															
<u>Subarea 093</u>															
Aerial pound net count	3	3	3	3	0	0	0	2	2	3	3	4	4	4	2
Mean net days/day		3		3				1		2.5		3.5			3
Net days/month		93		90				31		75		108.5			90
	Total net days = 183							Total net days = 304.5							
	Total net days (contract period) = 487.5														
	Mean net days (Oct - Nov) = 91.5 Including Dec = 31							Mean net days (Jan - Jun) = 50.8 (Mar - Jun) = 76.1							
	Mean net days (contract period) = 54.2														

* - No flight in February.

Table 22. Pound net effort in Coan River, subarea 017, for the contract period 1988 and 1989. Data reported by half-month, mean net days per day, net days per month, by calendar year. Effort derived from aerial pound net counts and telephone canvass.

	1988							1989							
	<u>14 & 17 Oct</u>	<u>26 Oct</u>	<u>10 Nov</u>	<u>29 Nov</u>	<u>14 Dec</u>	<u>27 Jan</u>	<u>Feb*</u>	<u>10 Mar</u>	<u>30 Mar- 4 Apr</u>	<u>12 Apr</u>	<u>24 Apr</u>	<u>4 May</u>	<u>19 May</u>	<u>14 Jun</u>	<u>28 Jun</u>
Coan River															
<u>Subarea 017</u>															
Aerial pound net count	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2
Mean net days/day										1		2			2
Net days/month										30		62			60
Total net days = 0								Total net days = 152							
Total net days (contract period) = 152															
Mean net days = 0								Mean net days (Jan - Jun) = 25.3 (Apr - Jun) = 38							
Mean net days (contract period) = 16.9															

* - No flight in February.

Table 23. Maximum number of active stake gill net stands and estimated linear feet of net in the James River, reported by VMRC subareas, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 137</u>		<u>Subarea 237</u>		<u>Subarea 337</u>	
		<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>
James							
1989	Jan 1	0		0		0	
	Jan 2	0		0		0	
	Feb 1	0		2	714	0	
	Feb 2	0		2	714	0	
	Mar 1	4	3,930	2	714	0	
	Mar 2	4	3,930	6	2,142	0	
	Apr 1	4	3,930	6	2,142	0	
	Apr 2	4	3,930	6	2,142	0	
	May 1	0		0		0	
	May 2	0		0		0	
	Jun 1	0		0		0	
	Jun 2	0		0		0	

* - First stake gill nets reported during contract period occurred in the first half of February 1989.

Table 24. Maximum number of active stake gill net stands and estimated linear feet of net in the York River, reported by VMRC subareas, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 195</u>		<u>Subarea 295</u>		<u>Subarea 395</u>	
		<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>
York							
1988	Nov 1	0		3	2,124	2	698
	Nov 2	0		3	2,124	2	698
	Dec 1	0		0		2	698
	Dec 2	0		0		4	1,396
1989	Jan 1	0		0		4	1,396
	Jan 2	0		1	708	8	2,792
	Feb 1	0		0		17	5,933
	Feb 2	0		2	1,416	17	5,933
	Mar 1	0		18	12,744	46	16,054
	Mar 2	0		18	12,744	44	28,167
	Apr 1	0		26	18,408	51	32,648
	Apr 2	0		26	18,408	40	25,606
	May 1	0		0		2	1,280
	May 2	0		0		2	1,280
	Jun 1	0		0		0	
	Jun 2	0		0		0	

* - First stake gill nets reported during contract period occurred in the first half of November 1988.

Table 25. Maximum number of active stake gill net stands and estimated linear feet of net in the Rappahannock River, reported by VMRC subareas, by half-month, 1 October 1988 through 30 June 1989*. Data acquired by telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 177</u>		<u>Subarea 277</u>		<u>Subarea 377</u>	
		<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>	<u>No.</u>	<u>Estimated linear feet</u>
Rappahannock							
1988	Oct 1	0		2	384	0	
	Oct 2	0		7	3,792	0	
	Nov 1	0		6	2,928	0	
	Nov 2	0		6	2,928	0	
	Dec 1	0		1	96	0	
	Dec 2	0		7	3,216	0	
1989	Jan 1	0		8	3,552	0	
	Jan 2	0		8	3,552	0	
	Feb 1	0		8	3,552	0	
	Feb 2	0		8	3,552	0	
	Mar 1	0		8	3,552	2	800
	Mar 2	0		8	6,768	2	800
	Apr 1	0		8	7,008	0	
	Apr 2	0		8	7,008	0	
	May 1	0		4	864	0	
	May 2	0		2	384	0	
	Jun 1	0		0		0	
	Jun 2	0		0		0	

Table 26. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the James River, by VHRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 137</u>		<u>Subarea 237</u>		<u>Subarea 337</u>		<u>Total No.</u>	<u>Total linear feet</u>
		<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>		
James									
1988	Oct 1	2	1,800	5	4,500	3	1,350	10	7,650
	Oct 2	3	2,700	30	27,000	10	4,500	43	34,200
	Nov 1	15	6,750	25	11,250	9	4,050	49	22,050
	Nov 2	16	7,200	19	8,550	12	5,400	47	21,150
	Dec 1	0		2	900	2	900	4	1,800
	Dec 2	0		0		0		0	0
1989	Jan 1	0		0		0		0	0
	Jan 2	1	450	22	9,900	2	900	25	11,250
	Feb 1	3	1,350	14	6,300	3	1,350	20	9,000
	Feb 2	2	900	17	7,650	3	1,350	22	9,900
	Mar 1	10	4,500	15	6,750	6	2,700	31	13,950
	Mar 2	10	4,500	12	5,400	6	2,700	28	12,600
	Apr 1	6	2,700	5	2,250	0		11	4,950
	Apr 2	3	1,350	5	2,250	0		8	3,600
	May 1	4	1,800	3	1,350	3	1,350	10	4,500
	May 2	7	3,150	6	2,700	0		13	5,850
	Jun 1	6	2,700	6	2,700	0		12	5,400
	Jun 2	8	3,600	9	4,050	3	1,350	20	9,000

Table 27. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the York River, by WRRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 195</u>		<u>Subarea 295</u>		<u>Subarea 395</u>		<u>Total No.</u>	<u>Total linear feet</u>
		<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>		
York									
1988	Oct 1	41	36,900	10	9,000	4	2,400	55	48,300
	Oct 2	29	26,100	11	9,900	3	1,800	43	37,800
	Nov 1	22	19,800	6	5,400	2	1,200	30	26,400
	Nov 2	25	22,500	6	5,400	1	600	32	28,500
	Dec 1	5	4,500	3	2,700	0		8	7,200
	Dec 2	0		0		0		0	0
1989	Jan 1	0		0		1	600	1	600
	Jan 2	0		3	2,700	1	600	4	3,300
	Feb 1	0		8	7,200	9	5,400	17	12,600
	Feb 2	2	1,800	9	8,100	11	6,600	22	16,500
	Mar 1	32	28,800	15	13,500	8	4,800	55	89,400
	Mar 2	18	16,200	10	9,000	11	6,600	39	31,800
	Apr 1	22	19,800	9	8,100	11	6,600	42	34,500
	Apr 2	39	35,100	12	10,800	6	3,600	57	49,500
	May 1	53	47,700	19	17,100	6	3,600	78	68,400
	May 2	59	53,100	20	18,000	7	4,200	86	75,300
	Jun 1	35	31,500	15	13,500	2	1,200	52	46,200
	Jun 2	34	30,600	20	18,000	4	2,400	58	51,000

Table 28. Estimate of maximum number and linear feet of anchor gill nets fished by commercial watermen in the Rappahannock River, by VMRC subarea, by half-month, 1 October 1988 through 30 June 1989. Data acquired telephone and personal interviews.

<u>River</u>	<u>Half-month</u>	<u>Subarea 177</u>		<u>Subarea 277</u>		<u>Subarea 377</u>		<u>Total No.</u>	<u>Total linear feet</u>
		<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>	<u>No.</u>	<u>Linear feet</u>		
<u>Rappahannock</u>									
1988	Oct 1	2	1,800	15	13,500	2	650	19	15,950
	Oct 2	2	1,800	16	14,400	21	6,825	39	23,025
	Nov 1	3	2,700	16	5,200	21	6,825	40	14,725
	Nov 2	3	2,700	15	4,875	17	5,525	35	13,100
	Dec 1	0		16	5,200	8	2,600	24	7,800
	Dec 2	0		22	7,150	18	5,850	40	13,000
1989	Jan 1	0		32	10,400	17	5,525	49	15,925
	Jan 2	1	900	39	12,675	18	5,850	58	19,425
	Feb 1	3	2,700	36	11,700	21	6,825	60	21,225
	Feb 2	3	2,700	32	10,400	24	7,800	59	20,900
	Mar 1	4	3,600	32	10,400	24	7,800	60	21,800
	Mar 2	5	4,500	37	12,025	18	5,850	60	22,375
	Apr 1	7	6,300	7	2,275	0		14	8,575
	Apr 2	5	4,500	3	975	0		8	5,475
	May 1	5	4,500	6	1,950	0		11	6,450
	May 2	4	3,600	6	1,950	0		10	5,550
	Jun 1	6	5,400	8	2,600	0		14	8,000
	Jun 2	4	3,600	4	1,300	1	325	9	5,225

Table 29. Estimated drift gill net effort in James River, Upper Section (subarea 337), and two York River tributaries, the Pamunkey River (subarea 067), and the Mattaponi River (subarea 049), during the period 1 October 1988 - 30 June 1989*. Data reported as mean number of nets per month, mean length of each net, and estimated linear feet of net available to the fishery per month. (Effort estimates by local commercial fishermen, personal communications).

	March		April		May	
	No.	Lin.ft.	No.	Lin.ft.	No.	Lin.ft.
James River, Upper Section Subarea 337	40	12,000	40	12,000	20	6,000
Mean nets/month = 33.3; mean net length (in ft.) = 300; estimated mean linear ft./month = 10,000						
Mattaponi River, Subarea 049						
(Commercial)	12	3,500	24	7,200	24	7,200
(Recreational)	25	7,500	75	22,500	50	15,000
Mean nets/month = 70; mean net length (in ft.) = 300; estimated mean linear ft./month = 21,000						
Pamunkey River, Subarea 067						
(Commercial)	12	3,500	24	7,200	24	7,200
(Recreational)	50	15,000	150	45,000	100	30,000
Mean nets/month = 120; mean net length (in ft.) = 300; estimated mean linear ft./month = 36,000						

* - No drift gill nets reported during period from 1 October - 15 March 1989.

Table 30. Contribution of fishing effort by fyke nets, by half-month in the James and York rivers, by subareas, 1 October - 30 June 1989. Effort derived from personal and telephone interviews with fishermen.

Subarea	Month Half-month	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
337	No. of nets	10	11	11	11	12	12	0	2	4	7	22	20	23	26	26	24	26	0
	Mean net days/day	10.5		11		12		1		5.5		21		24.5		25		13	
	Net days/month	325.5		330		372		31		154		651		735		775		390	
Total net days (Oct - Dec) = 1,027.5										Total net days (Jan - Jun) = 2,736									
Total net days (contract period) = 3,763.5																			
Mean net days (Oct - Dec) = 342.5										Mean net days (Jan - Jun) = 456									
Mean net days/month (contract period) = 418.2																			
195	No. of nets	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1
	Mean net days/day	1		1		0.5								1				0.5	
	Net days/month	31		30		15.5								30				15	
Total net days (Oct - Dec) = 76.5										Total net days (Jan - Jun) = 45									
Total net days (contract period) = 121.5																			
Mean net days (Oct - Dec) = 25.5										Mean net days (Jan - Jun) = 7.5 (Apr - Jun) = 15									
Mean net days/month (contract period) = 13.5																			
395	No. of nets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Mean net days/day																	1	
	Net days/month																	30	
Total net days (Oct - Dec) = 0										Total net days (Jan - Jun) = 30									
Total net days (contract period) = 30																			
Mean net days (Oct - Dec) = 0										Mean net days (Jan - Jun) = 5 (Jun) = 30									
Mean net days/month (contract period) = 3.3																			

Table 31. Contributions of fishing effort by haul seine, by half-month, in specific water areas in Virginia, 1 October 1988 - 30 June 1989. Effort derived from personal and telephone interviews with fishermen.

<u>Water Code</u> <u>Subarea</u>	1988				1989					
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
	<u>1</u> <u>2</u>									
137		1				1 1	1 1	1 1	2 1	
237						1 1	1 1	1 1	1 1	
337						1 1	1 1	1		
195							1	4 4	7 6	
295							1	1 2	2 1	
711								4	4 4	
055							3	3		

Table 32. Commercial fishing effort assessment. Peak net counts, Fall 1988, and number of VMRC 1988 licenses issued.

	<u>Janes River</u>	<u>York River</u>	<u>Rappahamock River</u>	<u>Potomac River</u>	<u>Chesapeake Bay</u>	<u>Other Tributaries</u>	<u>Total</u>	<u>VMRC Licenses Issued</u>
Pound net	0	4	13	57	66	6	146	183*
Stake gill net	0	7	7	N.S.	N.S.	N.S.	14	278
Anchor gill net	58	56	46	N.S.	N.S.	N.S.	160	5,140
Drift gill net	0	0	0	N.S.	N.S.	N.S.	0	
Haul seine	1	0	0	N.S.	N.S.	0	1	35
Fyke net	12	1	0	N.S.	N.S.	N.S.	13	174

* - Total number of licenses issued reflects VMRC data only and does not include licenses sold by the Potomac River Fisheries Commission.

Table 33. Commercial fishing effort assessment. Peak net counts, Spring 1989, and number of VHRC licenses issued January through May 1989.

	<u>James River</u>	<u>York River</u>	<u>Rappahannock River</u>	<u>Potomac River</u>	<u>Chesapeake Bay</u>	<u>Other Tributaries</u>	<u>Total</u>	<u>VHRC Licenses Issued</u>
Pound Net	4	10	19	64	64	24	185	146*
Stake Gill Net	10	77	8	N.S.	N.S.	N.S.	95	180
Anchor Gill Net	38	90	70	N.S.	N.S.	N.S.	198	
Drift Gill Net	40	144**	N.S.	N.S.	N.S.	N.S.	1,240	3,720
Haul Seine	4	9	0	N.S.	4	3	20	27
Fyke Net	26	2	0	N.S.	N.S.	N.S.	28	133

* - Total number of licenses issued reflects VHRC preliminary data and does not include licenses sold by Potomac River Fisheries Commission.

** - Mattaponi and Pamunkey, combined.

Appendix I. Virginia Marine Resources Commission water areas and modifications

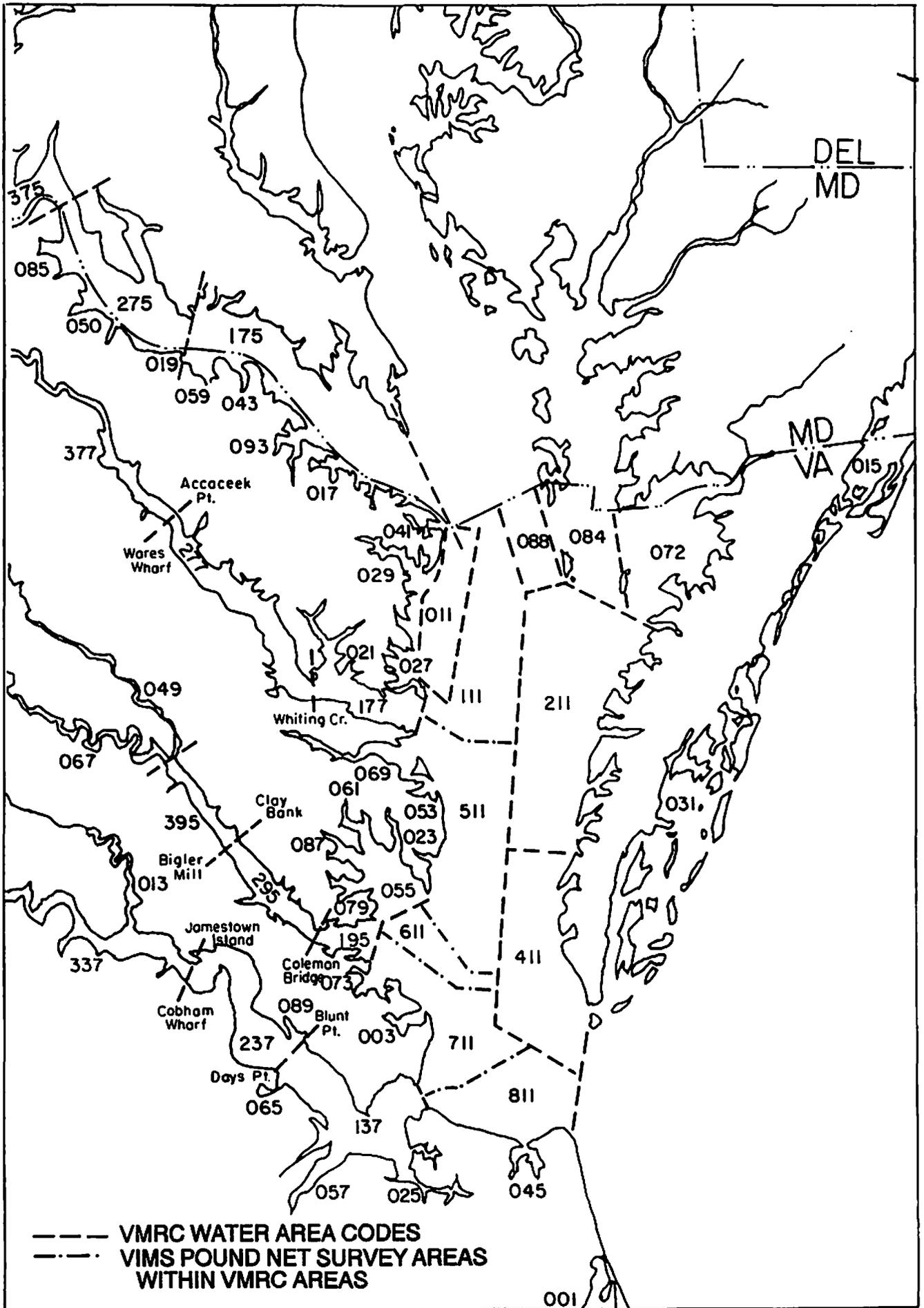
Appendix I. Virginia Marine Resources Commission water areas and modifications.

<u>CODE</u>	<u>BODY OF WATER</u>	<u>CODE</u>	<u>BODY OF WATER</u>
001	Back Bay	059	Nomini Bay
003	Back River	061	North River
005	Bogue Bay	063	Outlet Bay
007	Bradford Bay	064	Oyster Bay (Seaside Eastern Shore)
009	Burton's Bay	065	Pagan River
011	Chesapeake Bay (Western Mgt Area)	067	Pamunkey River
*111	Chesapeake Bay (Upper Western Section)	069	Piankatank River
211	Chesapeake Bay (Upper Eastern Section)	070	Pocomoke River
*311	Chesapeake Bay (Lower Western Section)	072	Pocomoke Sound
411	Chesapeake Bay (Lower Eastern Section)	073	Poquoson River
013	Chickahominy River	074	Potomac Creek (Potomac Rv. Trib.)
015	Chincoteague Bay	075	Potomac River, unclassified
017	Coan River	175	Potomac River (Lower Section)
018	Cobb Bay (Seaside Eastern Shore)	275	Potomac River (Lower Central Section)
019	Currioman Bay	375	Potomac River (Upper Central Section)
021	Corrotoman River	475	Potomac River (Upper Section)
023	East River	076	Potomac River Trib. (Unclassified)
025	Elizabeth River	177	Rappahannock River (Lower Section)
027	Fleets Bay	277	Rappahannock River (Central Section)
028	Gargathy Bay (Seaside Eastern Shore)	377	Rappahannock River (Upper Section)
029	Great Wicomico River	078	Rosier Creek (Potomac Rv. Trib.)
031	Hog Island Bay	079	Severn River
033	Horn Harbor	081	South Bay
137	James River (Lower Section)	083	Swash Bay
237	James River (Central Section)	084	Tangier Sound
337	James River (Upper Section)	088	West Tangier Management Area
038	Kegotank Bay (Seaside Eastern Shore)	085	Upper Machodoc Creek
039	Lafayette River	086	Upshur Bay (Seaside Eastern Shore)
041	Little Wicomico River	087	Ware River
043	Lower Machodoc Creek	089	Warwick River
045	Lynnhaven Bay	090	Watts Bay (Seaside Eastern Shore)
047	Magothy Bay	091	Willoughby Bay
049	Mattaponi River	092	Winter Harbor (Chesapeake Bay Tributary)
050	Mattox Creek (Potomac Rv. Trib.)	093	Yeocomico River
051	Metomkin Bay	195	York River (Lower Section)
053	Milford Haven	295	York River (Central Section)
055	Mobjack Bay	395	York River (Upper Section)
057	Nansemond River	097	Unclassified Seaside Bays and Rivers
		099	Unclassified Tributaries of Chesapeake Bay

*These areas have been sub-divided to correspond to VIMS aerial pound net count designations, as follows:

- 511 Windmill Point - New Point
- 611 York Spit
- 711 Tue Marsh - Old Point
- 811 Willoughby Spit - Cape Henry

Appendix I



Appendix II. Active pound net sites in Virginia waters and Potomac River in 1988-89.

Pound Net Sites, Fall 1988.

Chesapeake Bay

Rappahannock River

Potomac River and Virginia tributaries.

Pound Net Sites, Spring 1989.

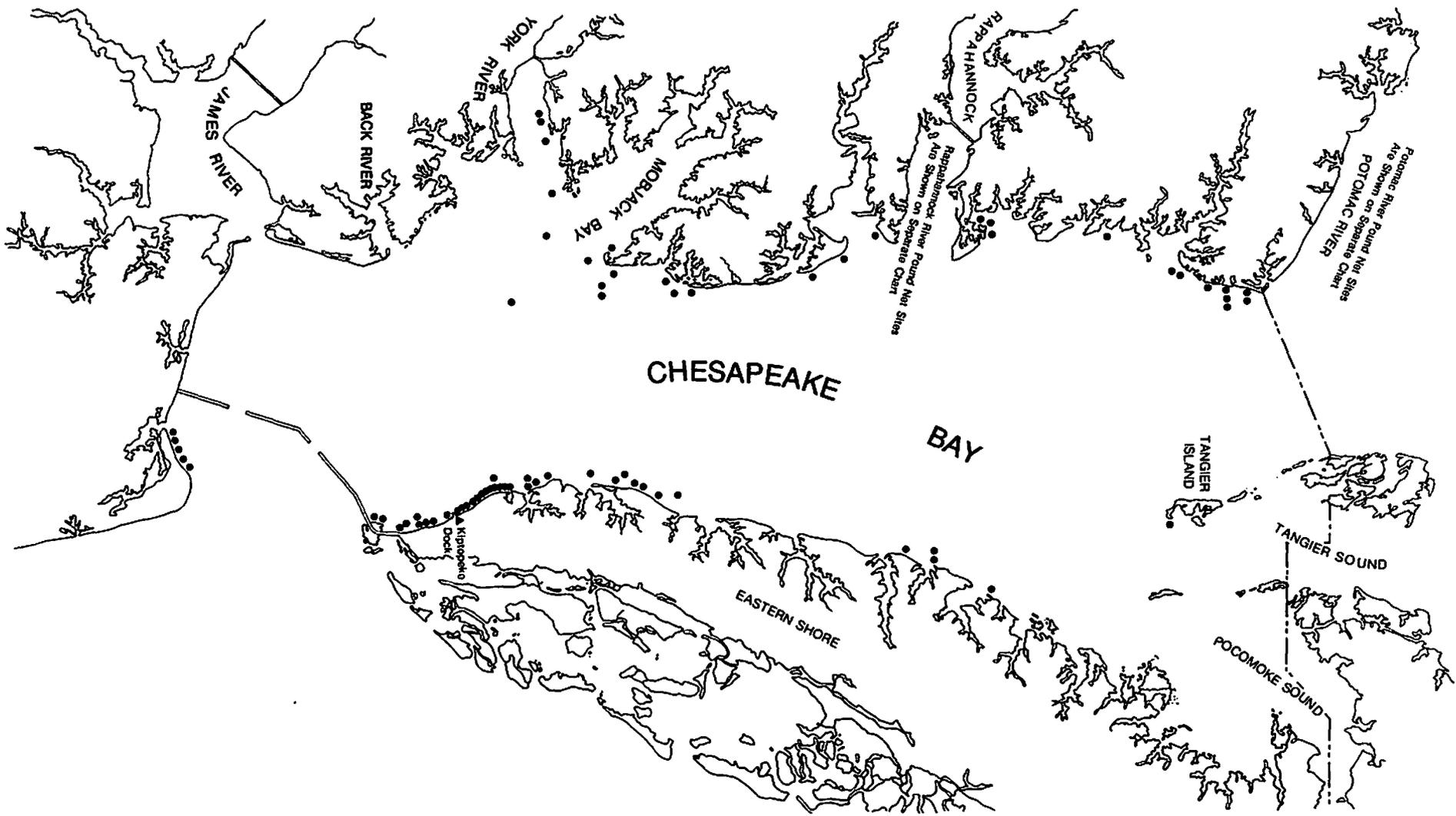
Chesapeake Bay

James River

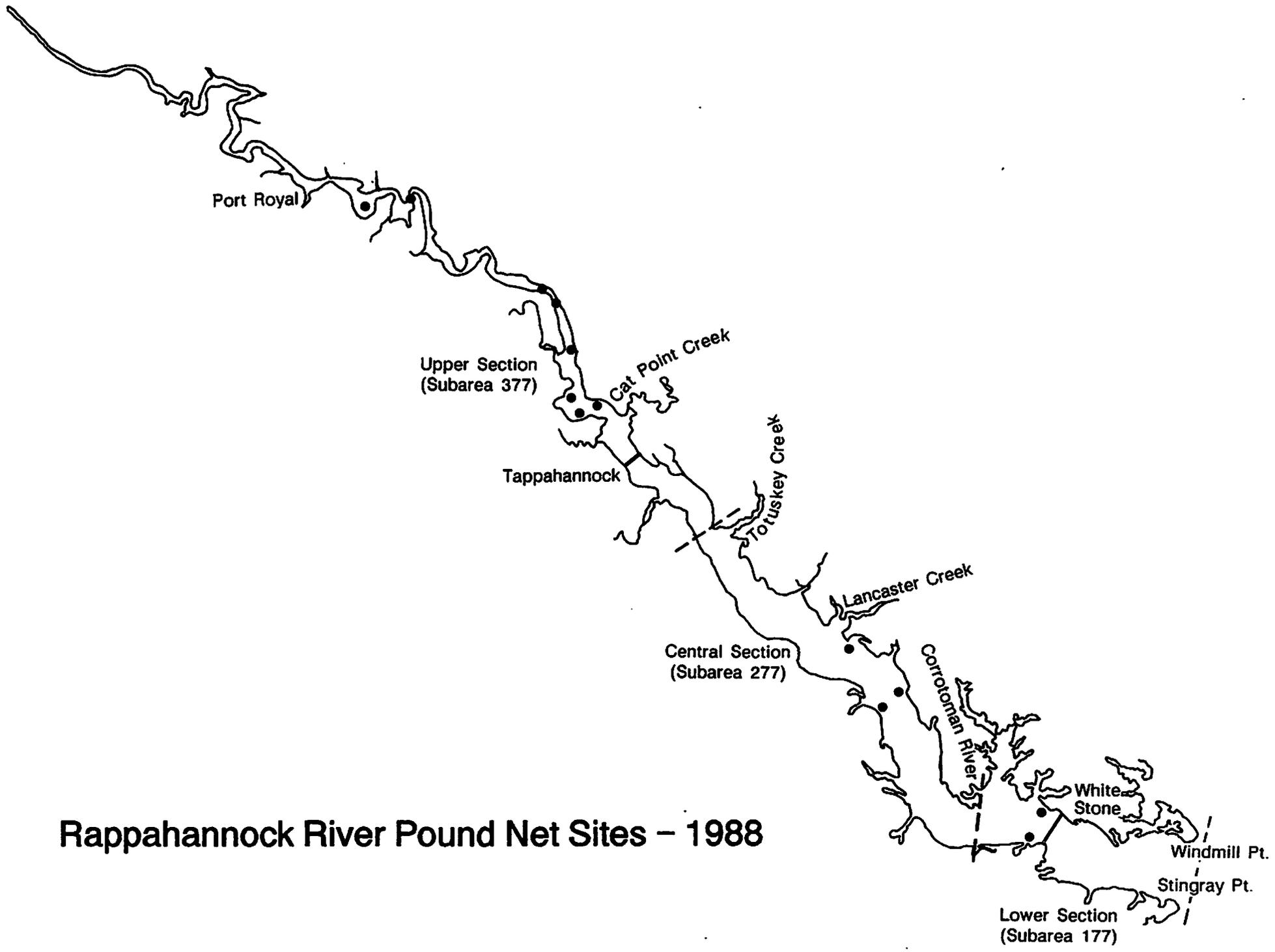
Rappahannock River

Potomac River and Virginia tributaries

Chesapeake Bay Pound Net Sites, Fall 1988.

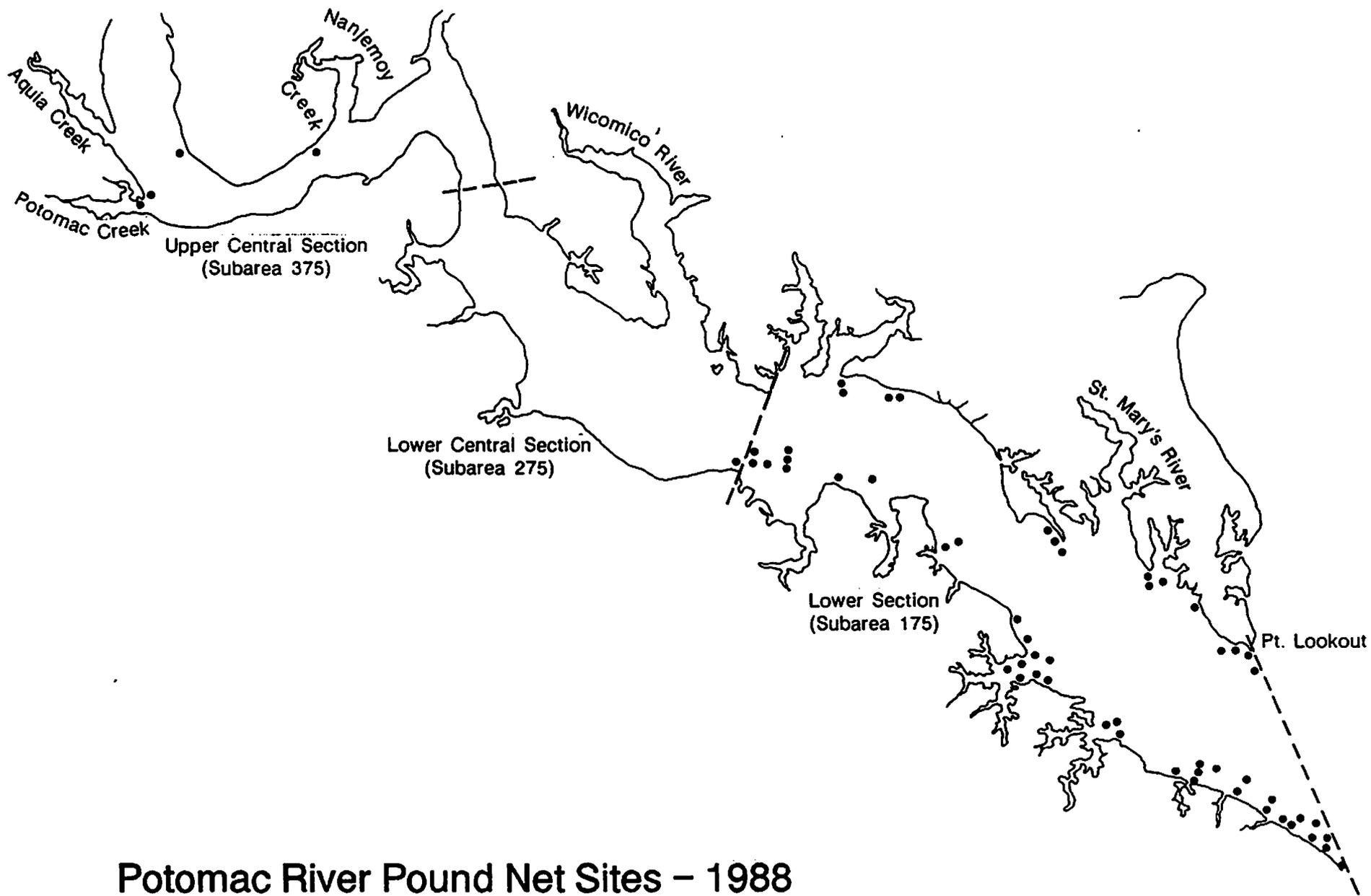


Rappahannock River Pound Net Sites, Fall 1988.



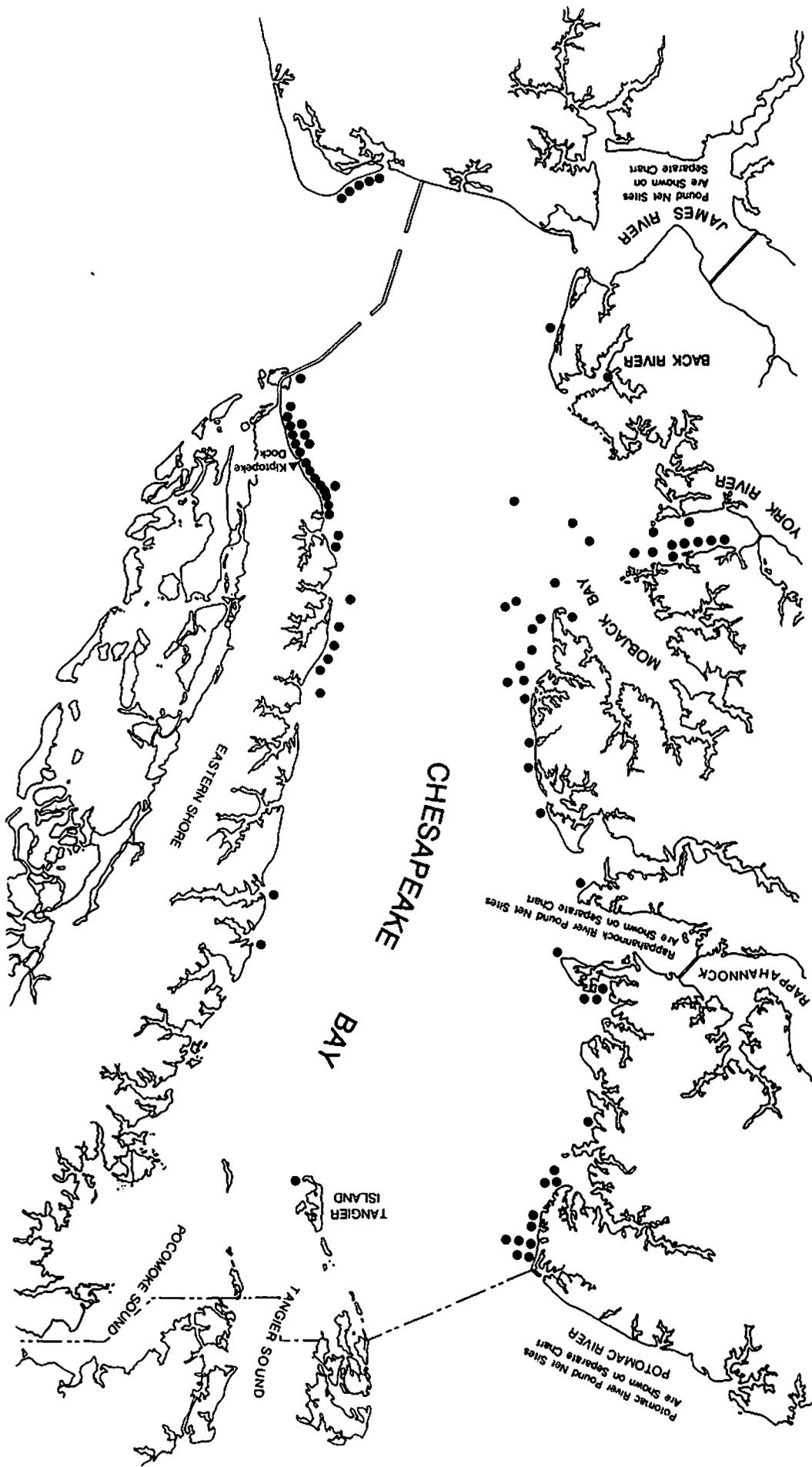
Rappahannock River Pound Net Sites – 1988

Potomac River Pound Net Sites, Fall 1988.

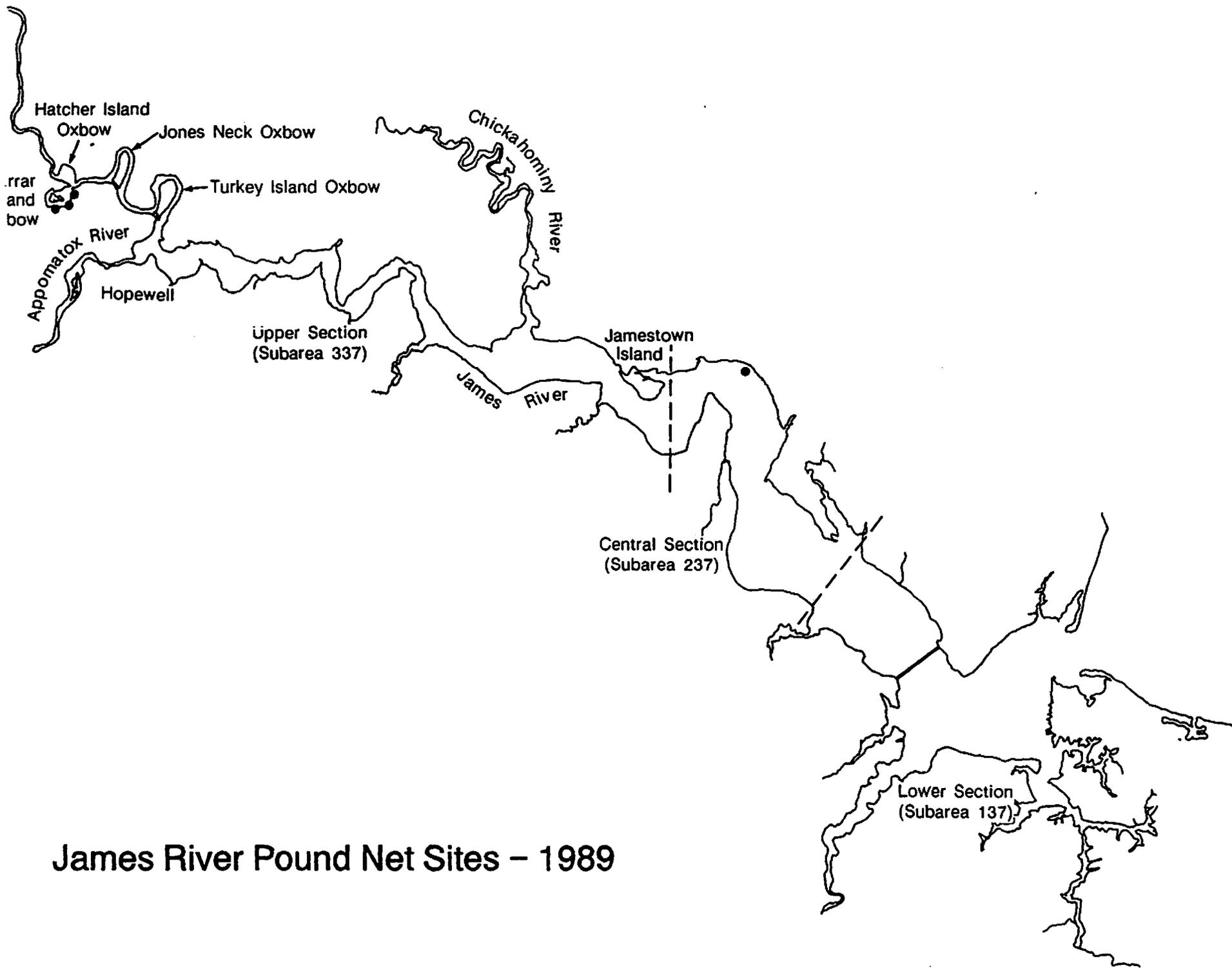


Potomac River Pound Net Sites – 1988

Appendix II. Chesapeake Bay Pound Net Sites, Spring 1989.

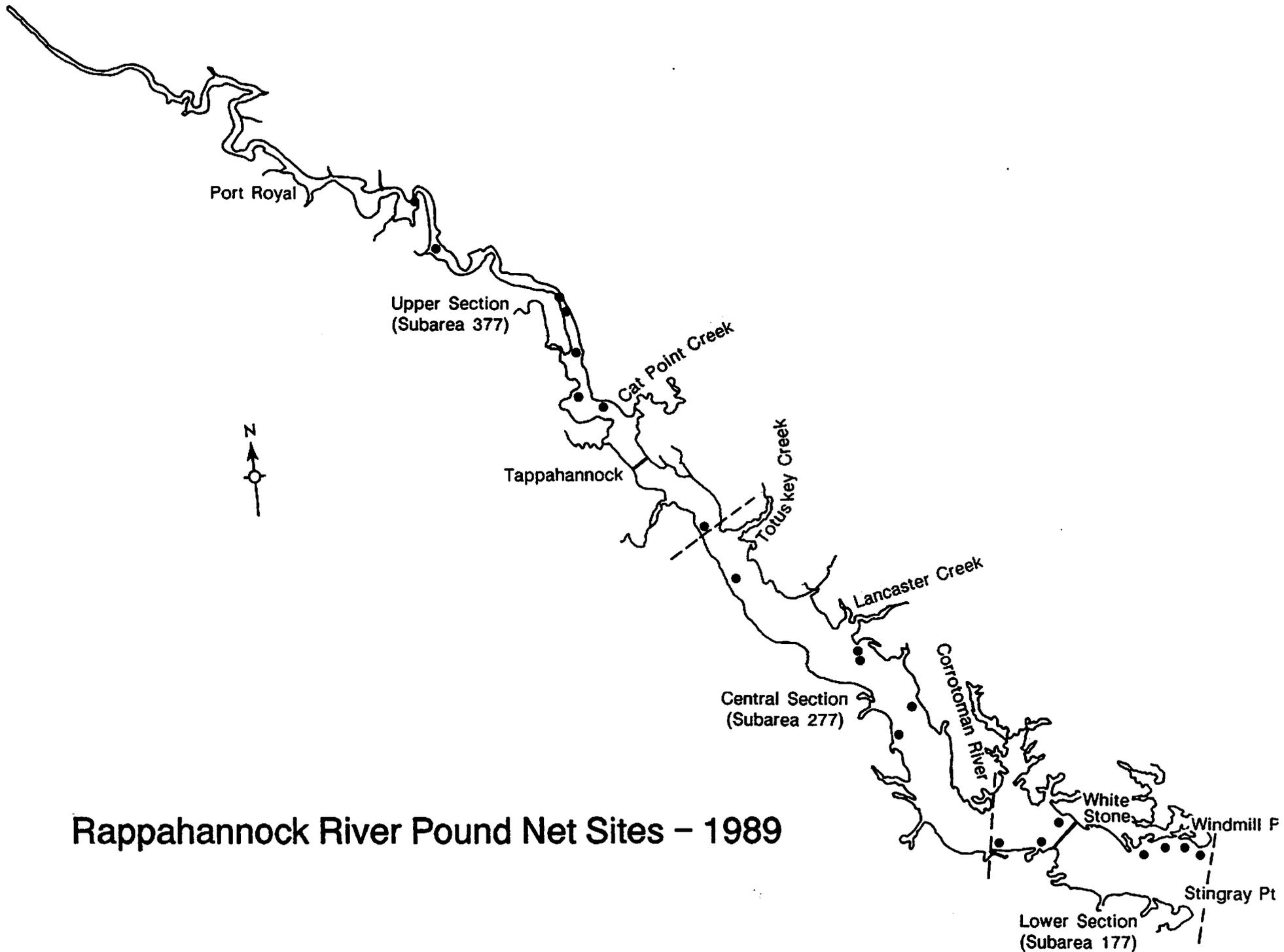


James River Pound Net Sites, Spring 1989.



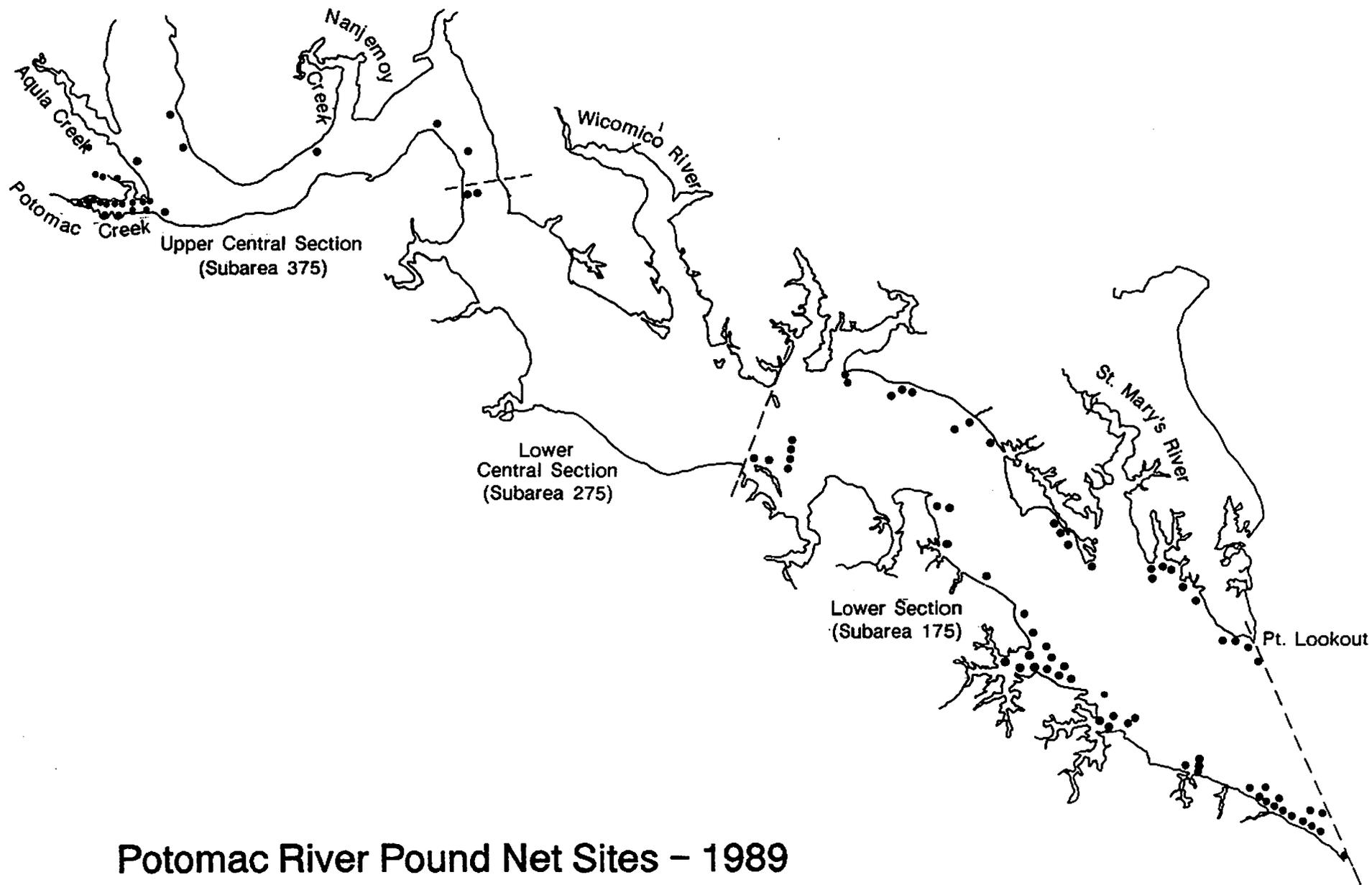
James River Pound Net Sites – 1989

Rappahannock River Pound Net Sites, Spring 1989.



Rappahannock River Pound Net Sites - 1989

Potomac River Pound Net Sites, Spring 1989.



Potomac River Pound Net Sites - 1989

VIRGINIA INSTITUTE OF MARINE SCIENCE



1001007228

VIMS SH 35 V8 A87 1989
The assessment of commercial fishing effort in Virginia : annual report.

DEMCO
