DATA ON THE DISTRIBUTION AND ABUNDANCE OF SUBMERSED AQUATIC VEGETATION IN THE TIDAL POTOMAC RIVER AND TRANSITION ZONE OF THE POTOMAC ESTUARY, MARYLAND, VIRGINIA, AND THE DISTRICT OF COLUMBIA, 1983 AND 1984

By Virginia Carter, Nancy B. Rybicki, Robert T. Anderson,
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CONVERSION FACTORS AND SYMBOLS

Multiply	By	To obtain
meter (m)	3.33	foot (ft)
square meter (m^2)	11.11	square foot (ft^2)
centimeter (cm)	0.39	inch (in)
square centimeter (cm^2)	0.16	square inch (in^2)
kilometer (km)	0.62	mile (mi)
kilometer (km)	0.54	nautical mile (nm)

Temperature in degrees Celsius (C) can be converted to degrees Farenheit (F) as follows:

$$F = 9/5\ (C) + 32$$

River kilometer (rkm) is defined as the distance from the mouth of the river or tributary in kilometers.

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ABSTRACT

This report summarizes data on the distribution and abundance of submersed aquatic vegetation collected in the tidal Potomac River and transition zone of the Potomac Estuary during 1983 and 1984. Plant species were identified and dry weight determined for selected sites. Substrate types were identified on transects. Water-quality characteristics measured include temperature, specific conductance, and transparency as indicated by Secchi depth. Maps were made of the distribution of individual species based on transect samples and a complete shoreline survey.

INTRODUCTION

Between 1978 and 1981, the U.S. Geological Survey surveyed the submersed aquatic vegetation of the tidal Potomac River and Estuary (Paschal and others, 1982; Haramis and Carter, 1983; Carter and others, 1983, 1985). This survey was part of an interdisciplinary study of the hydrodynamic, chemical and biological processes in the tidal Potomac River and Estuary (Callender and others, 1984). The 1978-81 survey showed that the tidal river was nearly devoid of submersed aquatic plants, and that the greatest abundance and diversity was found in the transition zone of the estuary.

In 1983, numerous species of submersed aquatic plants returned to the tidal river, giving scientists reason to believe that environmental conditions and water quality had improved. In 1983, we began a new study of distribution and abundance of submersed aquatic vegetation concentrating on the tidal Potomac River, but extending the survey into the transition zone and part of the estuary. The objectives of this study were:

1) to collect and identify all species of submersed aquatic plants found in the tidal river and larger tributaries.
2) to use both shoreline surveys and sampled transects to determine the distribution and abundance of the submersed aquatic vegetation
3) to collect data comparable to that collected in the 1978-81 survey in order to quantify the changes between the two periods.

This open-file report presents the data collected during 1983-1984.

One of the new submersed plants identified in Dyke Marsh, Virginia, in 1982, and now (1984) fairly widespread in the upper tidal river is Hydrilla verticilla, an exotic species from Southeast Asia which has become a nuisance in Florida and other southeastern states. Believed to be a relative newcomer to the Washington, D.C. area (Steward and others, 1984), this plant grows rapidly and has the potential to outcompete other species. Another study was begun to document the distribution, growth rate, and tuber production of Hydrilla in the tidal Potomac River, and the competition between Hydrilla and other species. The results of this work are reported in a separate report (Rybicki and others, 1985).

Acknowledgments

This work was partially supported by the U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi. We thank all our colleagues in the National Park Service, the Government of the District of Columbia, and the Northern Virginia Community College for their assistance. We also appreciate the assistance of associates from the Audubon Naturalist Society, who helped us with the field work on several occasions.

DESCRIPTION OF STUDY AREA

The tidal Potomac River and Estuary can be divided into three salinity-related zones (Callendar and others, 1984)(fig. 1). The tidal river above Quantico, Virginia contains fresh water except during periods of drought or extremely low river discharge. The transition zone of the estuary between Quantico, Virginia and the U.S. Highway 301 Bridge has fresh to brackish water (0.5 parts per thousand (ppt) to 18 ppt ocean-derived salts) and extensive saltwater-freshwater mixing occurs. The estuary below the U.S. Highway 301 Bridge contains saline water (5.0 to 18 ppt ocean-derived salts). The tidal river, transition zone, estuary, and their tributaries have a deep channel that is flanked on either side by wide shallow flats or shoals suitable for the growth of submersed aquatic plants.

METHODS

Shoreline surveys of the tidal river and tributaries were conducted in July 1983, and June, July and October of 1984. These surveys were done by boat, at low tide, using rakes to gather samples and to check whether vegetation was rooted or floating. In 1984, percent cover by submersed aquatic vegetation and the proportion of each species were estimated and referenced to 1-km grids shown on U.S. Geological Survey 7½ minute topographic maps with bathymetry added. The ranges of percent cover that were used (<10, 10 to 40, 40 to 70, 70 to 100) are those used by Orth and others (1979). These data were supplied to the U.S. Environmental Protection Agency for use in their Chesapeake Bay-wide

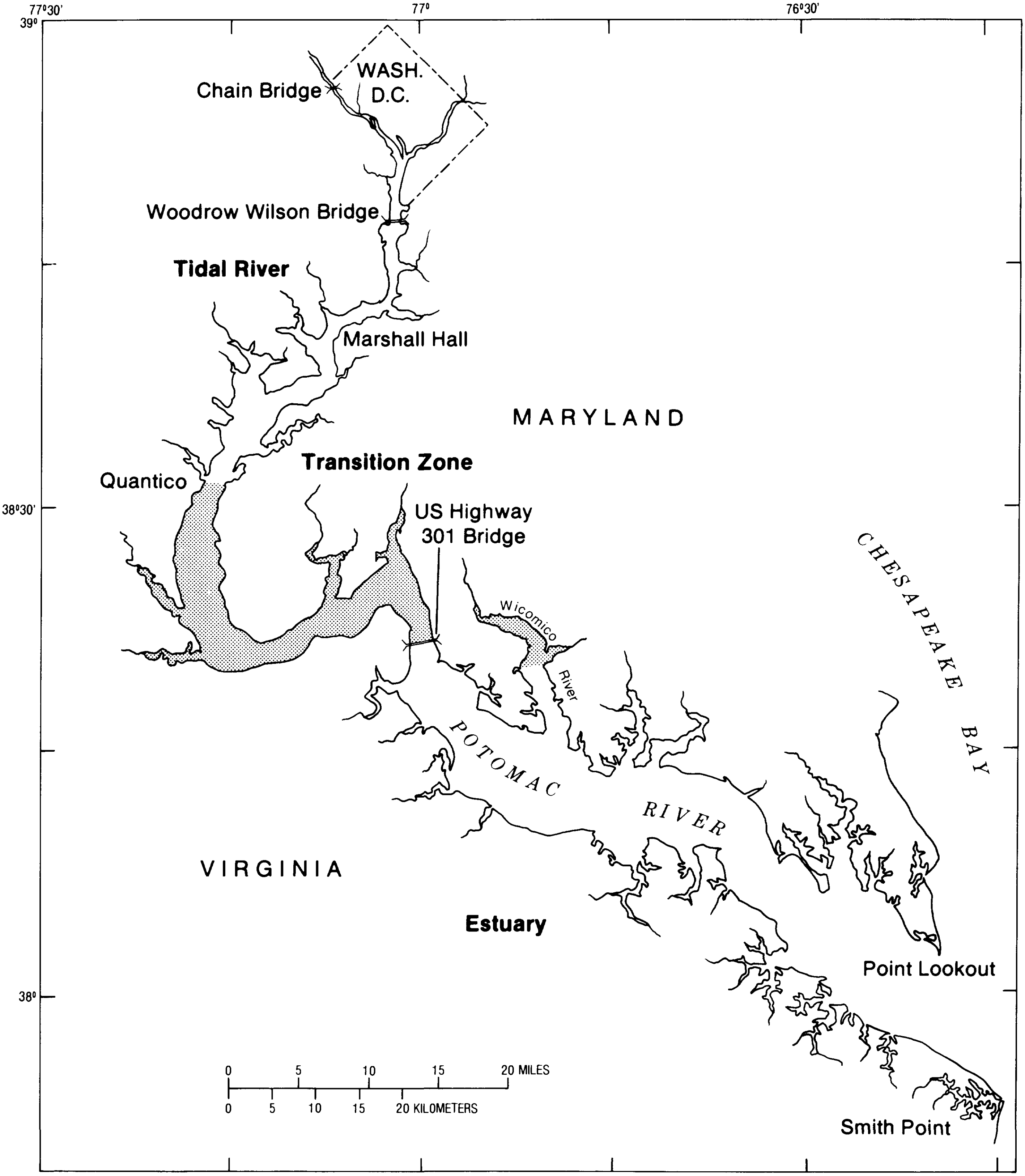

Figure 1: The tidal Potomac River and Estuary.

status report on submersed aquatic vegetation, and the distribution information was transferred to small-scale maps for publication in this report.

In addition to the shoreline survey, 94 transects were sampled. The original tidal river transects (figs. 2 and 3) from the 1978-81 survey were resampled in July and September 1984 using previously reported methods (Paschal and others, 1982) which are summarized here for the reader's convenience. The original transects were supplemented by twelve new transects to provide more complete coverage (fig. 2). In the transition zone and estuary, only transects that had three or more species present between 1978 and 1981 were resampled (fig. 3).

Codes for the transects in figures 2 and 3 provide information on location and the river- or tributary-mile for each location. For example, in MN-01T-2, MN is Mattawoman Creek, 01T is one nmi (nautical mile) up the tributary from the mouth, -2 is the second transect; in NP-06R, NP is between Nanjemoy Creek and the Port Tobacco River, 06R is the sixth transect on the edge of the main river. River kilometers (rkm) are measured from the mouth of the Potomac, whereas tributary kilometers (also as rkm) were measured from the mouth of the tributary.

Locations of transects are marked on nautical charts, and transects were sampled by placing a rope, marked with floats, perpendicular to the shoreline. Most transects had sampling stations at 5 m, 15 m, and then at 15-m intervals from shore. These transects were terminated at five stations (60 m) from shore when no vegetation was present or at two stations (30 m) beyond the last vegetated station. Where water depth exceeded 2.0 m at 60 m of linear distance, samples were taken at four stations along the transect determined by depth (0.5-m depth, 1.0-m depth, 1.5-m depth, and 2.0-m depth). Measurements of water depth were not adjusted for tidal stage.

All stations were sampled three times using modified oyster tongs with blades welded across the teeth to facilitate biting into the sediment to collect rooted plants. The area sampled with each grab was about 930 cm^2. All species were identified. Taxonomic nomenclature is according to Hotchkiss (1950, 1967), Radford and others (1964), and Wood (1967). A species list for the tidal Potomac River and transition zone in 1983 and 1984 is shown in table A-1 (in appendix), and species found at each vegetated transect in spring and fall 1984 are shown in table A-2 (in appendix).

Samples were dried at approximately 110 C^0, and dry weight (g) per grab and biomass (g/m^2) of each species were determined with two exceptions: (1) At transects DM-1R, DM-2R, and DM-3R, *Hydrilla* biomass was expressed as g/grab only. By fall, in the Dyke Marsh area, *Hydrilla* formed a tangled mass of plants completely filling the water column; a grab area of 930 cm^2 results in a sample from a significantly larger area. For this reason, grab sample biomass of *Hydrilla* can not be directly related to area. (2) Biomass measurements were only made on 3 of the 26 transects sampled in the transition zone and estuary.

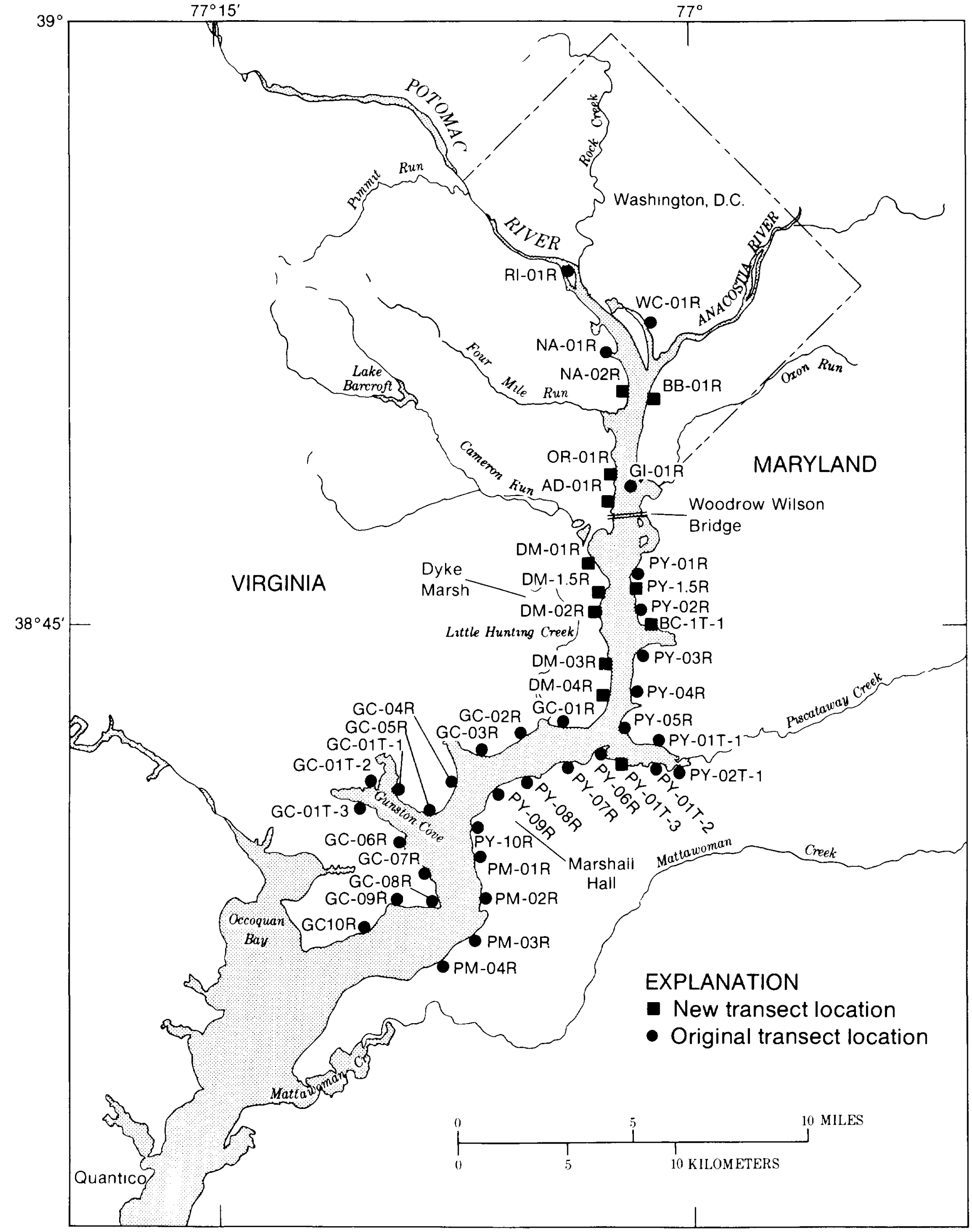

Figure 2: Location of vegetation sampling transects in the tidal Potomac River above Mattawoman Creek. Codes for transects give location and tributary or river-mile for each location. RI is Roosevelt Island, NA is National Airport, OR is Orinoco Bay, AD is Alexandria Dock, DM is Dyke Marsh, GC is Gunston Cove, BB is Bolling Air Force Base, GI is Goose Island, PY is Piscataway Creek, BC is Broad Creek, PM is Pomonkey Creek.

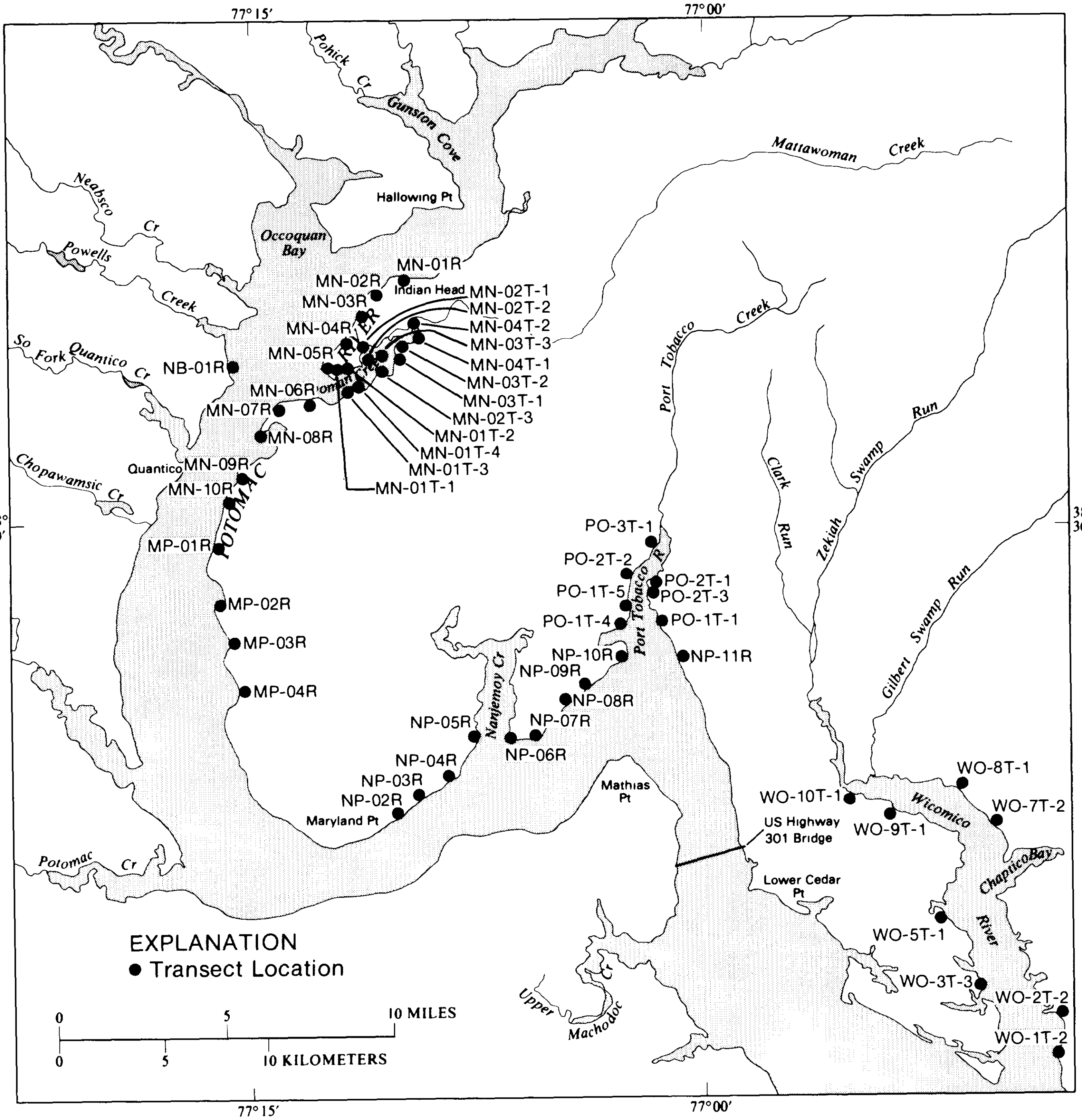

Figure 3: Location of vegetation sampling transects from Mattawoman Creek to the Wicomico River. Codes for transects give location and tributary or river-mile for each location. MN is Mattawoman Creek, MP is Maryland Point, NP is Nanjemoy Creek-Port Tobacco River, PO is Port Tobacco River, WO is Wicomico River.

Total sampled dry weights and biomass at each transect during each sampling period are shown in table A-3 (in appendix). Relative occurrence of vegetated transects, stations, and grabs (grouped by 1978-81 study areas and salinity zones) are shown in table A-4 (in appendix). Biomass in g/m^2 of each species at each station during each sampling period are shown in tables A-5 through A-18 (in appendix). Based on the shoreline surveys in 1983 and 1984, and the 94 transects sampled in 1984, maps were made of the species diversity in 1983 and 1984 (figs. B-1, B-2, in appendix) and of the distribution of each species in 1984 (figs. B-3 through B-22, in appendix).

Substrate types on new (1984) transects were identified visually and tactily as cobble, gravel, sand, silt, clay, or detritis (table C-1, in appendix). Water transparency measurements were made using a Secchi disk (tables C-2, C-3, C-4 and C-5, in appendix). Specific conductivity and temperature were measured with a YSI Model 33 SCT[1/] meter (tables C-4, C-5, in appendix).

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[1] Use of trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

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Appendix A. Vegetation data.

Table A-1.--List of submersed aquatic plants found in the tidal Potomac River and transition zone, 1983, 1984

Taxonomy follows Hotchkiss (1950, 1967) unless otherwise noted

Family	Species	Common name
Characeae (muskgrass family)	*Nitella flexilis* (L.) Ag.[1]	Muskgrass
Najadaceae (pondweed family)	*Potamogeton perfoliatus* L.	Redhead-grass
	Potamogeton pectinatus L.	Sago pondweed
	Potamogeton crispus L.	Curly pondweed
	Potamogeton pusillus L.	Slender pondweed
	Ruppia maritima L.	Widgeongrass
	Zannichellia palustris L.	Horned pondweed
	Najas quadalupensis (Spreng.) Morong	Southern naiad
	Najas minor All	
Hydrocharitaceae (frogbit family)	*Vallisneria americana* Michx.	Wildcelery
	Elodea canadensis (Michx.) Planch.	Common elodea
	Hydrilla verticillata (L.f.) Caspary.[3]	Hydrilla
Ceratophyllaceae (coontail family)	*Ceratophyllum demersum* L.	Coontail
Haloragidaceae (watermilfoil family)	*Myriophyllum spicatum* L.	Eurasian watermilfoil
Pontedariaceae (pickerelweed family)	*Heteranthera dubia* (Jacquin) MacM.[2]	Water-stargrass

[1]Keyed from Wood (1967).

[2]Keyed from Radford and others (1974).

[3]Keyed from Godfrey and Wooten (1979).

Table A-2:--Species of submersed aquatic plants found on vegetated transects in the tidal Potomac River and transition zone, 1984

n.d. is no data available

Transect	Species[1/] Spring	Fall
OR-1R	Hydr, Vall, P. pect., Zann	Heter
AD-1R	Hydr, P. cris	Hydr
DM-1R	Hydr	Cerat, Hydr
DM-2R	Hydr	Cerat, Hydr
DM-3R	Hydr	Cerat, Hydr, Nitella
DM-4R	Hydr, P. pect Vall, Zann,	Cerat, Heter, Hydr, Myrio, Nitella, Vall,
GC-1R	Cerat	Heter, Hydr, Myrio
GC-2R		Myrio, Vall
GC-4R		Vall
WC-1R	Vall, Zann	Vall
BC-1T-1	Cerat, Heter, Hydr, Myrio, Najas g., P. cris	n.d.
PY-1R	P. pect, Vall	Myrio
PY-1.5R	Myrio, Najas m.	n.d.
PY-2R	Myrio, Najas m.	Cerat, Heter, Hydr, Myrio, Najas g., Vall
PY-3R		Hydr, Myrio Najas g.
PY-4R		Najas g.
PY-5R		Heter
PY-7R	Myrio	Heter, Hydr, Myrio, Najas g., Najas m., Vall
PY-8R	Vall, Zann	Cerat, Heter, Hydr, Myrio Najas g., Vall, Zann
PY-1T-1		Myrio
PY-1T-3	Cerat	n.d.
PY-2T-1	Hydr	Cerat, Hydr, Myrio
MN-9R	Cerat, P. pect	Vall
MN-10R	P. pect, Vall, Zann	Vall

Table A-2: Species of submersed aquatic plants found on vegetated transects in the tidal Potomac River and transition zone, 1984--continued

n.d. is no data available

Transect	Species[1/] Spring	Fall
MN-4T-1	Cerat	
MN-4T-2	Vall	Cerat, Myrio, Najas g., P. pus, Vall
MP-3R	Vall	n.d.
MP-4R	Myrio, Najas g., Vall, Zann	n.d.
NP-2R	n.d.	Vall
NP-3R	n.d.	Vall
NP-4R	n.d.	P. perf, Vall
NP-5R	n.d.	Vall
NP-6R	n.d.	Cerat, P. pect, P. perf, Vall
NP-7R	n.d.	Vall
NP-8R	n.d.	Vall
NP-9R	n.d.	P. perf, Vall
NP-10R	n.d.	Myrio, P. perf, Vall
NP-11R	n.d.	Vall
NY-3T-3	n.d.	Cerat, Myrio, P. pus
PO-1T-5	n.d.	Myrio, Vall
PO-2T-1	n.d.	Vall
PO-2T-2	n.d.	Vall
PO-2T-3	n.d.	Vall
PO-3T-1	n.d.	Myrio, Vall
WO-5T-1	n.d.	P. perf, Rupp
WO-8T-1	n.d.	Najas g., Rupp

1/Cerat = Ceratophyllum demersum, Heter = Heteranthera dubia, Hydr = Hydrilla verticillata, Myrio = Myriophyllum spicatum, Najas g = Najas guadalupensis, Najas m = Najas minor, Nitella = Nitella flexilis, P. cris = Potamogeton crispus, P. pect = Potamogeton pectinatus, P. pus = Potamogeton pusillus, Vall = Vallisneria americana, Zann = Zannichellia palustris P. perf = Potamogeton perfoliatus, Rupp = Ruppia maritima

Table A-3: Total sampled dry weight and biomass of all species of submersed aquatic vegetation in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. means no data available; Tr is trace; a means no biomass calculated--see text

	Spring 1984		Fall 1984	
Transect	Dry weight	Biomass	Dry weight	Biomass
OR-1R	5	19	190	667
AD-1R	1	3	47	163
DM-1R	Tr	Tr	86	a
DM-2R	Tr	Tr	330	a
DM-3R	8	27	719	a
DM-4R	3	11	197	691
GC-1R	Tr	Tr	117	412
GC-2R	0	0	21	73
GC-4R	0	0	70	246
WC-1R	5	16	110	386
BC-1T-1	93	325	n.d.	n.d.
PY-1R	2	9	33	116
PY-1.5R	64	223	n.d.	n.d.
PY-2R	5	18	935	3282
PY-3R	0	0	83	291
PY-4R	0	0	Tr	Tr
PY-5R	0	0	16	56
PY-7R	15	54	379	1332
PY-8R	2	5	153	536
PY-1T-1	0	0	16	72
PY-1T-3	Tr	Tr	n.d.	n.d.
PY-2T-1	1	4	14	49
MN-9R	Tr	Tr	16	57
MN-10R	2	7	6	21
MN-4T-1	Tr	Tr	0	0
MN-4T-2	Tr	Tr	29	102
MP-3R	Tr	Tr	n.d.	n.d.
MP-4R	15	54	n.d.	n.d.
NP-2R	n.d.	n.d.	167	586
NP-6R	n.d.	n.d	96	337
WO-8T-1	n.d.	n.d.	204	920

Table A-4: Relative occurrence of vegetated transects, stations, and grabs for the tidal Potomac River and Estuary, 1984

Relative occurrence as number vegetated/total number; n.d. is no data available

Salinity Zones/ Study Areas	Sampling Unit	1984	
		Spring	Fall
Tidal River			
Roosevelt Island to Wilson Bridge	Transects	3/6	3/6
	Stations	7/28	10/32
	Grabs	17/24	19/96
Dyke Marsh	Transects	4/4	4/4
	Stations	10/23	17/27
	Grabs	13/69	35/81
Piscataway-Mattawoman Creeks	Transects	12/38	13/35
	Stations	33/203	47/202
	Grabs	48/609	87/606
Gunston Cove	Transects	1/13	3/13
	Stations	1/65	14/77
	Grabs	1/195	17/231
Pomonkey Creek	Transects	0/4	n.d.
	Stations	0/20	n.d.
	Grabs	0/60	n.d.
Transition Zone			
Maryland Point	Transects	2/4	n.d.
	Stations	20/38	n.d.
	Grabs	39/114	n.d.
Nanjemoy Creek-Port Tobacco River	Transects	n.d.	16/17
	Stations	n.d.	76/135
	Grabs	n.d.	173/405
Transition Zone and Estuary			
Wicomico River	Transects	n.d.	2/8
	Stations	n.d.	9/44
	grabs	n.d.	24/132

Table A-5: Dry weight and biomass of *Vallisneria americana* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace; n.d. is no data available

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
OR-1R	5	Tr	Tr	0	0
DM-4R	5	0	0	Tr	Tr
	15	2	7	56	198
	30	0	0	33	115
GC-2R	5	0	0	18	64
GC-4R	10	0	0	44	153
	15	0	0	26	91
WC-1R	5	3	9	51	180
	15	0	0	43	152
	20	0	0	15	54
	25	Tr	Tr	0	0
PY-1R	30	1	4	0	0
PY-2R	75	0	0	24	84
	105	0	0	Tr	Tr
PY-7R	5	0	0	86	301
	15	0	0	19	66
	30	0	0	15	51
PY-8R	5	0	0	Tr	Tr
	30	Tr	Tr	17	60
	45	0	0	Tr	Tr
MN-9R	15	0	0	8	28
	30	0	0	8	30
MN-10R	15	1	3	2	5
	30	0	0	5	17
	45	1	5	0	0
MN-4T-2	5	0	0	17	58
	6	Tr	Tr	n.d.	n.d.
MP-3R	5	Tr	Tr	n.d.	n.d.

Table A-5: Dry weight and biomass of *Vallisneria americana* in the tidal Potomac River and transition zone, 1984--continued

Dry weight in grams; biomass in grams per square meter; Tr is trace; n.d. is no data available

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
MP-4R	30	Tr	Tr	n.d.	n.d.
	45	Tr	Tr	n.d.	n.d.
	60	Tr	Tr	n.d.	n.d.
	75	Tr	Tr	n.d.	n.d.
	90	Tr	Tr	n.d.	n.d.
	105	2	9	n.d.	n.d.
	120	3	12	n.d.	n.d.
	135	1	4	n.d.	n.d.
	150	Tr	Tr	n.d.	n.d.
	165	Tr	Tr	n.d.	n.d.
	180	Tr	Tr	n.d.	n.d.
	195	Tr	Tr	n.d.	n.d.
	210	Tr	Tr	n.d.	n.d.
	225	Tr	Tr	n.d.	n.d.
	240	Tr	Tr	n.d.	n.d.
	255	Tr	Tr	n.d.	n.d.
	270	2	5	n.d.	n.d.
	285	Tr	Tr	n.d.	n.d.
	300	1	5	n.d.	n.d.
NP-2R	5	n.d.	n.d.	14	48
	15	n.d.	n.d.	39	138
	30	n.d.	n.d.	26	92
	45	n.d.	n.d.	38	133
	60	n.d.	n.d.	Tr	Tr
NP-6R	45	n.d.	n.d.	18	34
	60	n.d.	n.d.	25	89
	75	n.d.	n.d.	15	51
	90	n.d.	n.d.	11	39
	105	n.d.	n.d.	3	12
	120	n.d.	n.d.	3	12

Table A-6: Dry weight and biomass of Myriophyllum spicatum in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

		Spring		Fall	
Transect	Distance from shore	Dry weight	Biomass	Dry weight	Biomass
DM-4R	30	0	0	Tr	Tr
GC-1R	5	0	0	10	36
	15	0	0	4	15
	45	0	0	9	32
	75	0	0	Tr	Tr
	105	0	0	7	23
	135	0	0	4	13
	165	0	0	3	10
	180	0	0	Tr	Tr
	195	0	0	11	38
	210	0	0	Tr	Tr
GC-2R	5	0		3	9
BC-1T-1	5	5	18	n.d.	n.d.
	15	2	8	n.d.	n.d.
	30	Tr	Tr	n.d.	n.d.
	45	18	62	n.d.	n.d.
	60	Tr	Tr	n.d.	n.d.
	75	6	21	n.d.	n.d.
	90	13	47	n.d.	n.d.
	105	Tr	Tr	n.d.	n.d.
PY-1R	30	0	0	19	68
	45	0	0	13	47
PY-1.5R	15	63	222	n.d.	n.d.
	45	Tr	Tr	n.d.	n.d.
	60	Tr	Tr	n.d.	n.d.
PY-2R	5	0	0	Tr	Tr
	15	5	17	1	4
	30	Tr	Tr	4	12
	45	0	0	Tr	Tr
	60	0	0	56	196
	75	0	0	3	11
	90	0	0	2	6
	105	0	0	6	10
	120	0	0	Tr	Tr
	135	0	0	2	8

Table A-6: Dry weight and biomass of *Myriophyllum spicatum* in the tidal Potomac River and transition zone, 1984--continued

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

		Spring		Fall	
Transect	Distance from shore	Dry weight	Biomass	Dry weight	Biomass
PY-3R	5	0	0	Tr	Tr
PY-7R	15	0	0	Tr	Tr
	45	10	35	0	0
	60	6	19	2	7
PY-8R	60	0	0	Tr	Tr
	75	0	0	Tr	Tr
	90	0	0	4	15
PY-1T-1	5	0	0	2	6
	15	0	0	11	39
	30	0	0	Tr	Tr
	45	0	0	3	12
PY-2T-1	5	0	0	4	15
	15	0	0	2	6
	60	0	0	4	14
	90	0	0	3	12
MN-4T-2	5	0	0	10	36
MP-4R	165	Tr	Tr	n.d.	n.d.

Table A-7: Dry weight and biomass of *Zannichellia palustris* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace; n.d. is no data available

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
OR-1R	5	Tr	Tr	0	0
DM-4R	5	Tr	Tr	0	0
	30	Tr	Tr	0	0
WC-1R	5	Tr	Tr	0	0
PY-8R	5	1	4	7	25
	15	Tr	Tr	2	7
MN-10R	45	Tr	Tr	0	0
MP-4R	165	Tr	Tr	n.d.	n.d.

Table A-8: Dry weight and biomass of *Hydrilla verticillata* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace; a means no biomass calculated--see text

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
OR-1R	5	Tr	Tr	0	0
AD-1R	5	Tr	Tr	34	118
	15	0	0	13	46
DM-1R	5	0	0	44	a
	15	Tr	Tr	39	a
	30	0	0	2	7
	45	Tr	Tr	Tr	Tr
	75	0	0	Tr	Tr
	90	0	0	Tr	Tr
DM-2R	3	Tr	Tr	0	0
	5	0	0	296	a
	15	0	0	31	a
DM-3R	5	2	8	275	a
	15	5	19	324	a
	30	0	0	98	a
	45	0	0	5	16
DM-4R	15	1	2	0	0
	30	Tr	Tr	4	15
	45	0	0	Tr	Tr
	60	0	0	Tr	Tr
GC-1R	5	0	0	Tr	Tr
	60	0	0	Tr	Tr
BC-1T-1	5	3	11	n.d.	n.d.
	105	Tr	Tr	n.d.	n.d.
PY-2R	5	0	0	Tr	Tr
	15	0	0	Tr	Tr
	30	0	0	Tr	Tr
	45	0	0	11	37
	60	0	0	Tr	Tr
	75	0	0	1	3
	120	0	0	Tr	Tr

Table A-8: Dry weight and biomass of *Hydrilla verticillata* in the tidal Potomac River and transition zone, 1984--continued

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
PY-3R	5	0	0	77	271
	15	0	0	Tr	Tr
	30	0	0	Tr	Tr
PY-7R	5	0	0	Tr	Tr
	60	0	0	Tr	Tr
	75	0	0	Tr	Tr
	90	0	0	Tr	Tr
PY-8R	30	0	0	Tr	Tr
	45	0	0	34	120
	60	0	0	3	9
	75	0	0	3	12
	90	0	0	4	14
	120	0	0	Tr	Tr
	135	0	0	9	30
PY-2T-1	15	1	4	0	0
	60	0	0	Tr	Tr
	90	0	0	Tr	Tr

Table A-9: Dry weight and biomass of *Potamogeton pectinatus* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
OR-1R	15	1	4	0	0
	30	4	14	0	0
DM-4R	45	Tr	Tr	0	0
PY-1R	5	1	4	0	0
MN-9R	30	Tr	Tr	0	0
MN-10R	45	Tr	Tr	0	0
NP-6R	60	Tr	Tr	0	0

Table A-10: Dry weight and biomass of *Potamogeton pusillus* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
MN-4T-2	5	0	0	1	4

Table A-11: Dry weight and biomass of *Potamogeton perfoliatus* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
NP-6R	30	0	0	13	47
	45	0	0	Tr	Tr
	60	0	0	7	24

Table A-12: Dry weight and biomass of *Najas minor* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
PY-1.5R	45	Tr	Tr	n.d.	n.d.
PY-2R	45	Tr	Tr	0	0
PY-7R	45	0	0	1	4

Table A-13: Dry weight and biomass of _Najas guadalupensis_ in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
BC-1T-1	75	Tr	Tr	n.d.	n.d.
PY-2R	5	0	0	10	36
	15	0	0	66	232
	30	0	0	49	172
	45	0	0	38	134
	60	0	0	38	134
	75	0	0	26	90
	90	0	0	69	243
	105	0	0	3	12
	120	0	0	46	163
	135	0	0	5	19
	150	0	0	35	121
PY-3R	5	0	0	4	14
	15	0	0	2	6
PY-4R	30	0	0	Tr	Tr
PY-7R	90	0	0	Tr	Tr
PY-8R	75	0	0	Tr	Tr
MN-4T-2	5	0	0	Tr	Tr
MP-4R	180	Tr	Tr	n.d.	n.d.
WO-8T-1	5	0	0	9	30
	15	0	0	28	99
	30	0	0	16	57
	45	0	0	Tr	Tr

Table A-14: Dry weight and biomass of *Nitella flexilis* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace

Transect	Distance from shore	Spring		Fall	
		Dry weight	Biomass	Dry weight	Biomass
DM-3R	15	Tr	Tr	0	0
	30	0	0	Tr	Tr
	45	0	0	Tr	Tr
DM-4R	30	0	0	Tr	Tr

Table A-15: Dry weight and biomass of *Heteranthera dubia* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

		Spring		Fall	
Transect	Distance from shore	Dry weight	Biomass	Dry weight	Biomass
OR-1R	15	0	0	13	47
	30	0	0	Tr	Tr
	45	0	0	9	33
	60	0	0	43	152
	75	0	0	124	436
DM-2R	5	0	0	Tr	Tr
DM-4R	5	0	0	Tr	Tr
	45	o	0	41	144
	60	0	0	59	206
GC-1R	5	0	0	70	246
BC-1T-1	15	5	17	n.d.	n.d.
PY-2R	5	0	0	Tr	Tr
	15	0	0	Tr	Tr
	45	0	0	270	948
	105	0	0	58	202
	120	0	0	Tr	Tr
PY-5R	5	0	0	16	54
PY-7R	15	0	0	106	371
	60	0	0	22	77
	75	0	0	130	455
	90	0	0	Tr	Tr
PY-8R	60	0	0	45	158
	75	0	0	Tr	Tr
	105	0	0	5	17

Table A-16: Dry weight and biomass of <u>Ceratophyllum</u> <u>demersum</u> in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

Transect	Distance from shore	Spring Dry weight	Spring Biomass	Fall Dry weight	Fall Biomass
DM-1R	5	0	0	2	12
	15	0	0	2	5
DM-2R	5	0	0	3	9
DM-3R	5	0	0	Tr	Tr
	15	0	0	11	38
	30	0	0	6	21
DM-4R	5	0	0	4	14
GC-1R	5	Tr	Tr	0	0
BC-1T-1	5	Tr	Tr	n.d.	n.d.
	30	3	9	n.d.	n.d.
	105	Tr	Tr	n.d.	n.d.
PY-2R	5	0	0	Tr	Tr
	15	0	0	5	18
	30	0	0	5	16
	45	0	0	Tr	Tr
	60	0	0	1	4
	75	0	0	Tr	Tr
PY-8R	75	0	0	18	81
	120	0	0	Tr	Tr
PY-1T-3	15	Tr	Tr	0	0
	45	Tr	Tr	0	0
	60	Tr	Tr	0	0
PY-2T-1	90	0	0	Tr	Tr
MN-9R	30	Tr	Tr	0	0
MN-4T-1	5	Tr	Tr	0	0
MN-4T-2	5	0	0	1	5
NP-6R	45	n.d.	n.d.	Tr	Tr

Table A-17: Dry weight and biomass of *Potamogeton crispus* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; n.d. is no data available; Tr is trace

		Spring		Fall	
Transect	Distance from shore	Dry weight	Biomass	Dry weight	Biomass
AD-1R	5	Tr	Tr	0	0
BC-1T-1	5	16	56	n.d.	n.d.
	15	7	25	n.d.	n.d.
	45	13	47	n.d.	n.d.

Table A-18: Dry weight and biomass of *Ruppia maritima* in the tidal Potomac River and transition zone, 1984

Dry weight in grams; biomass in grams per square meter; Tr is trace

		Spring		Fall	
Transect	Distance from shore	Dry weight	Biomass	Dry weight	Biomass
WO-8T-1	5	0	0	Tr	Tr
	15	0	0	1	4
	30	0	0	74	261
	45	0	0	31	109
	60	0	0	20	71
	75	0	0	25	89
	90	0	0	Tr	Tr

Appendix B. Maps of species distribution, 1983, 1984.

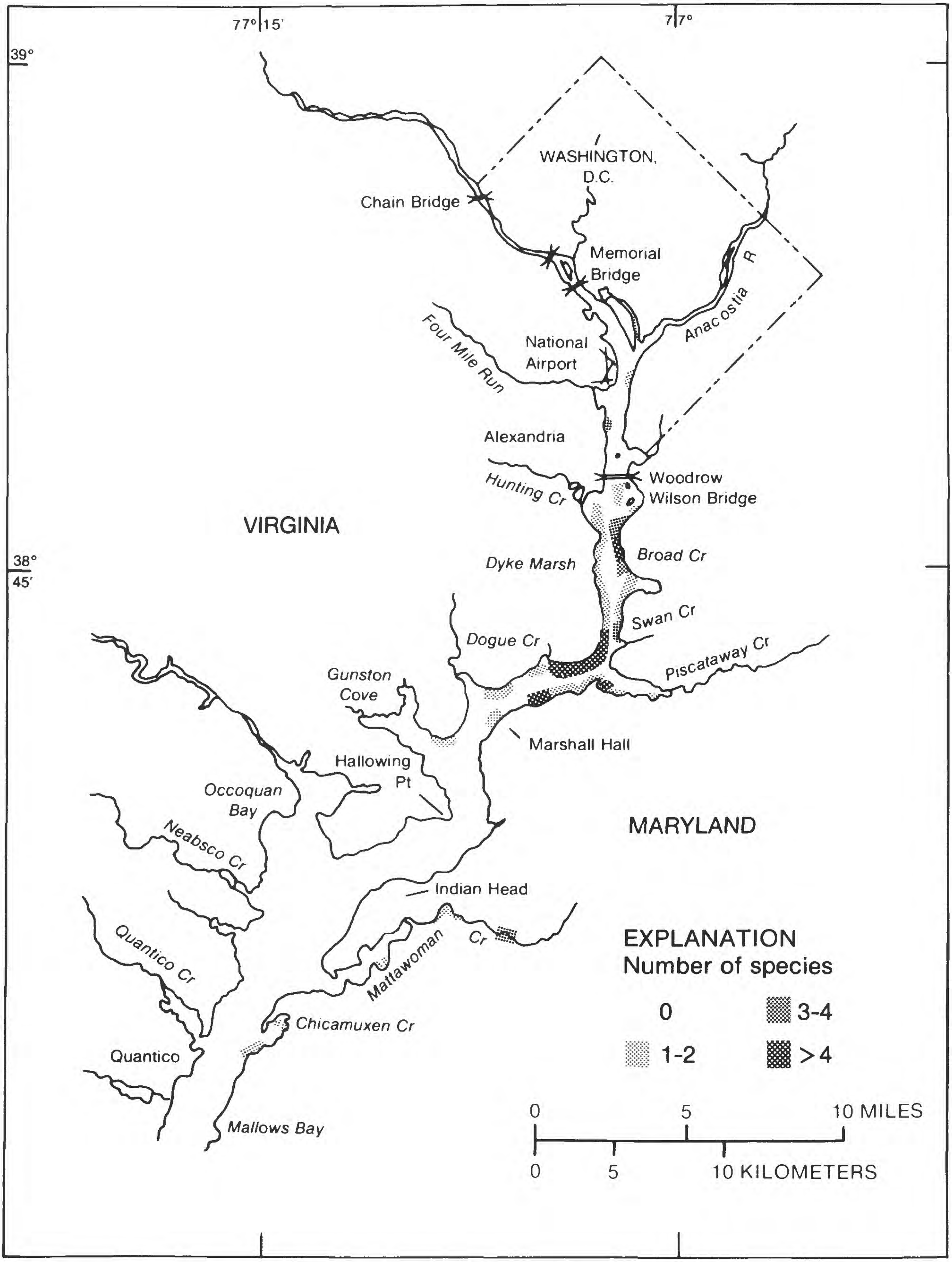

Figure B-1: Species diversity in the tidal Potomac River, 1983.

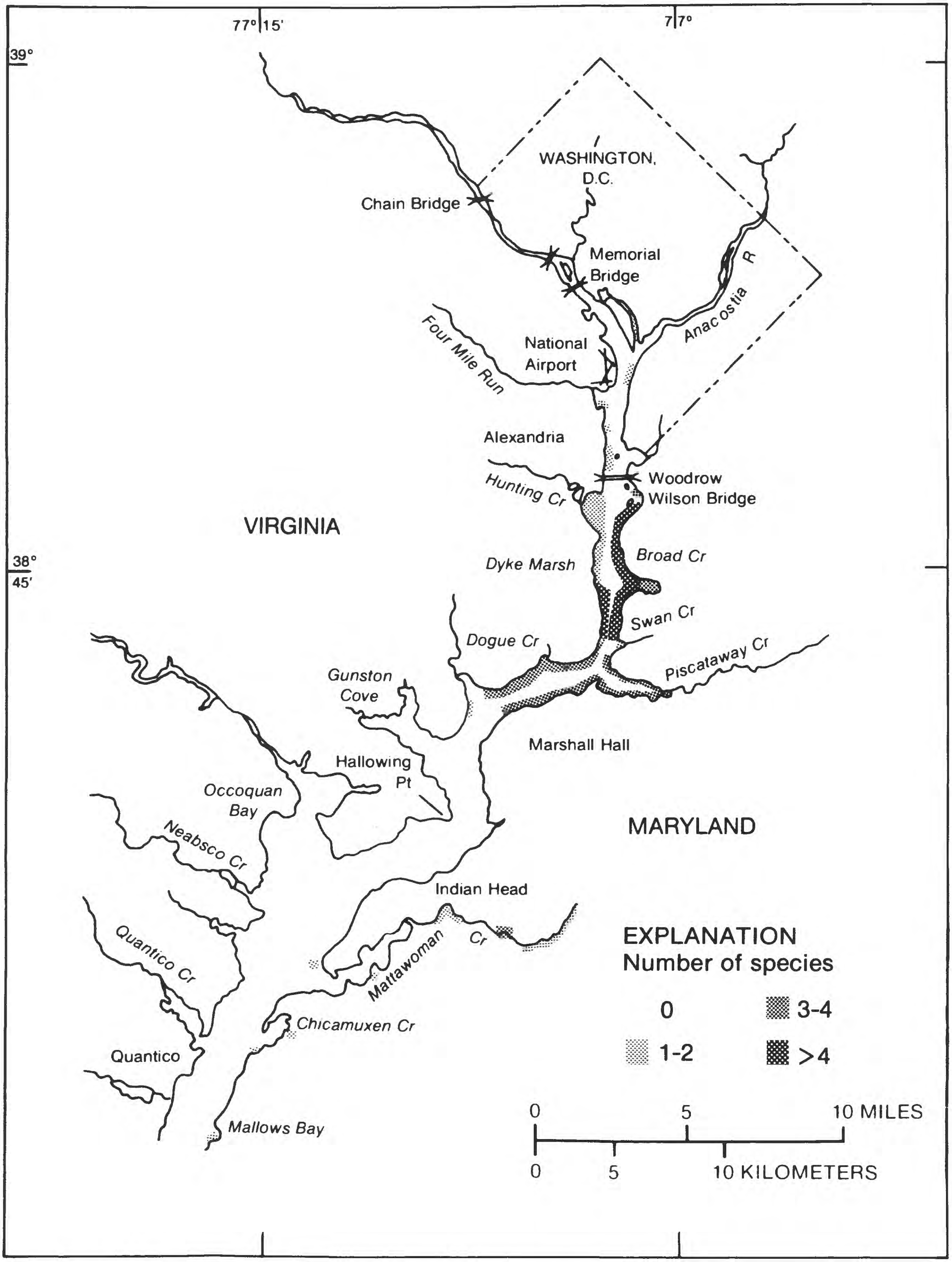

Figure B-2: Species diversity in the tidal Potomac River, 1984.

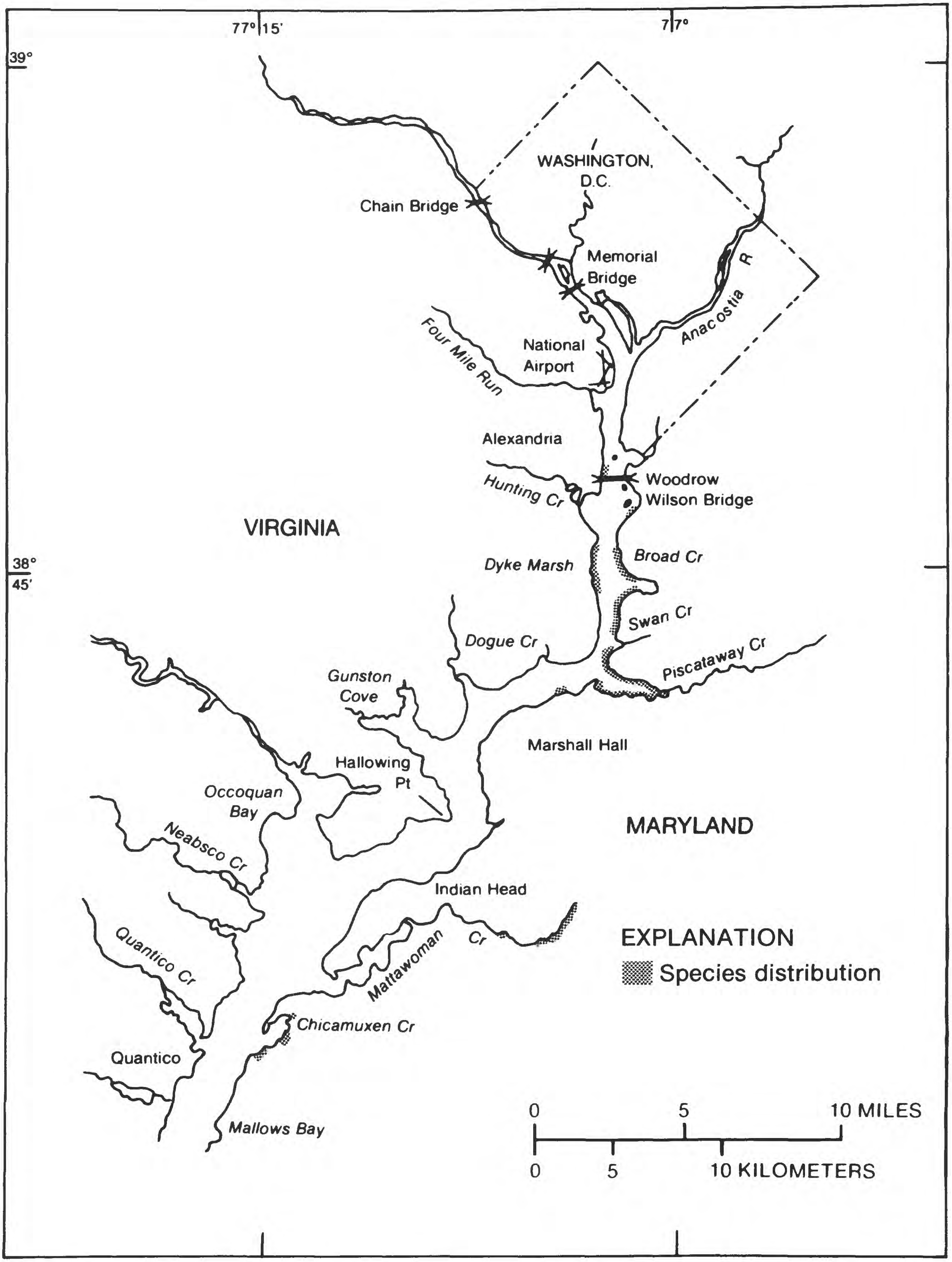

Figure B-3: Distribution of Ceratophyllum demersum in the tidal Potomac River, 1984.

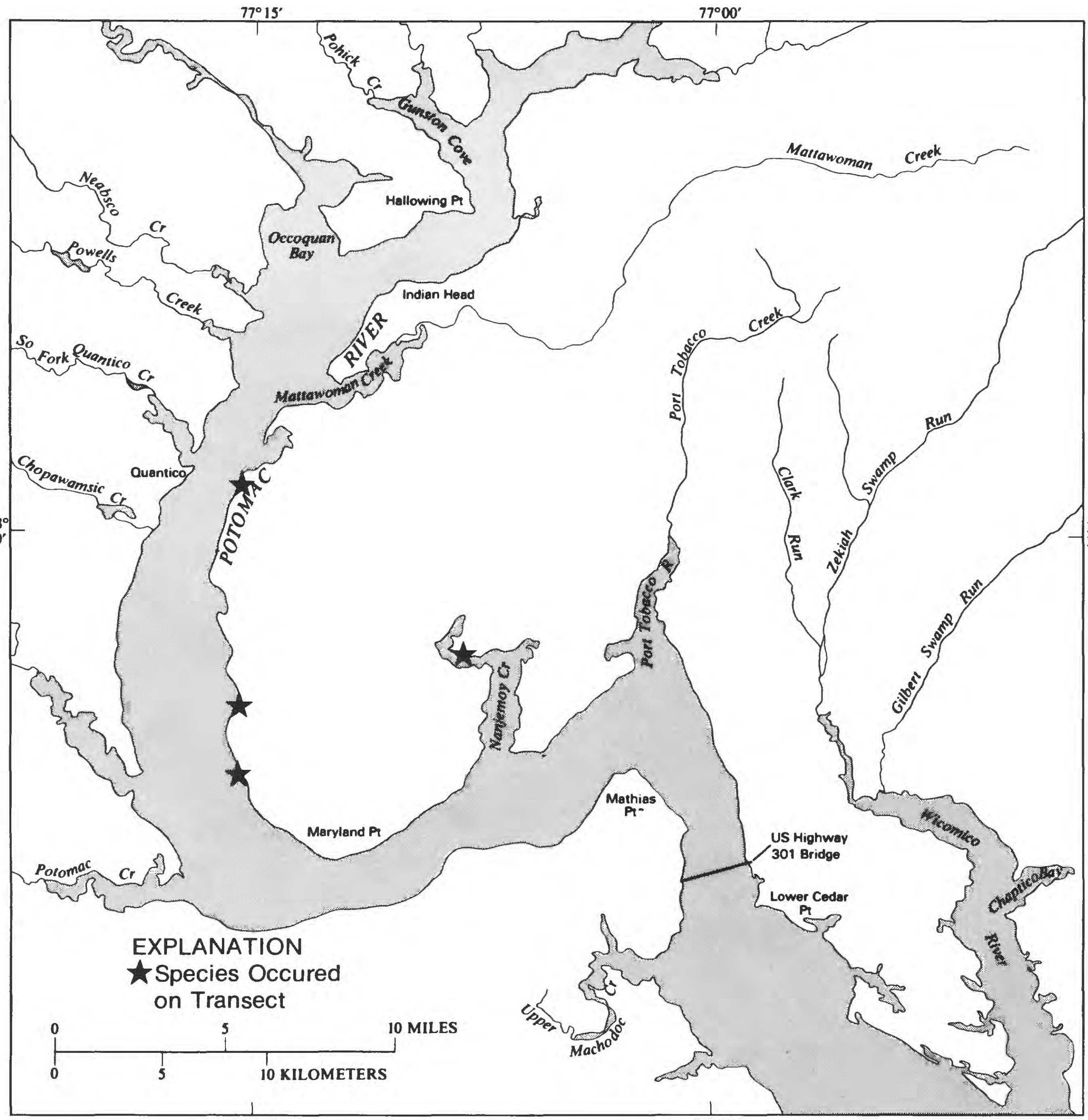

Figure B-4: Distribution of Ceratophyllum demersum in the transition zone and Potomac Estuary, 1984.

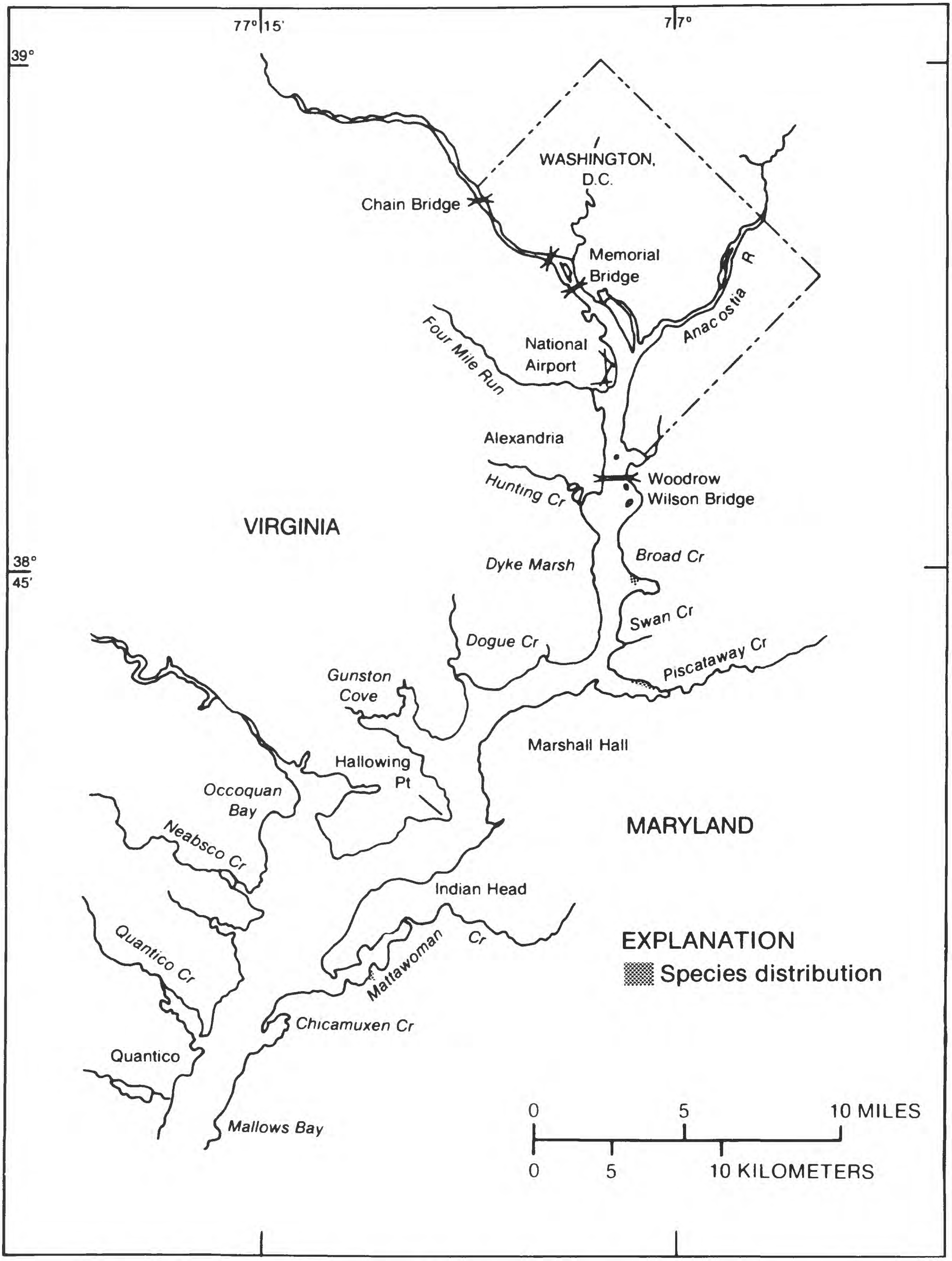

Figure B-5: Distribution of Elodea canadensis in the tidal Potomac River, 1984.

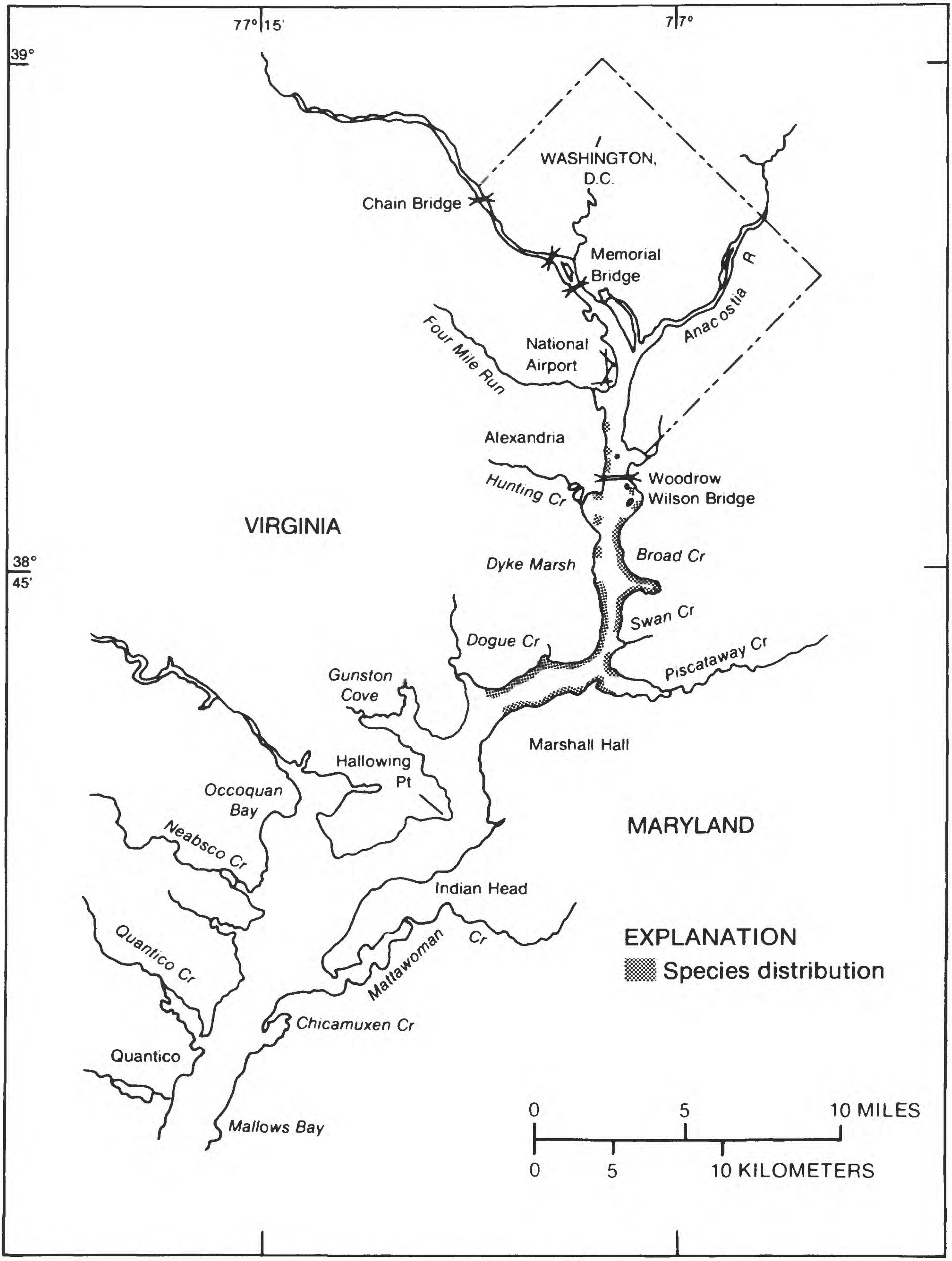

Figure B-6: Distribution of <u>Heteranthera dubia</u> in the tidal Potomac River, 1984.

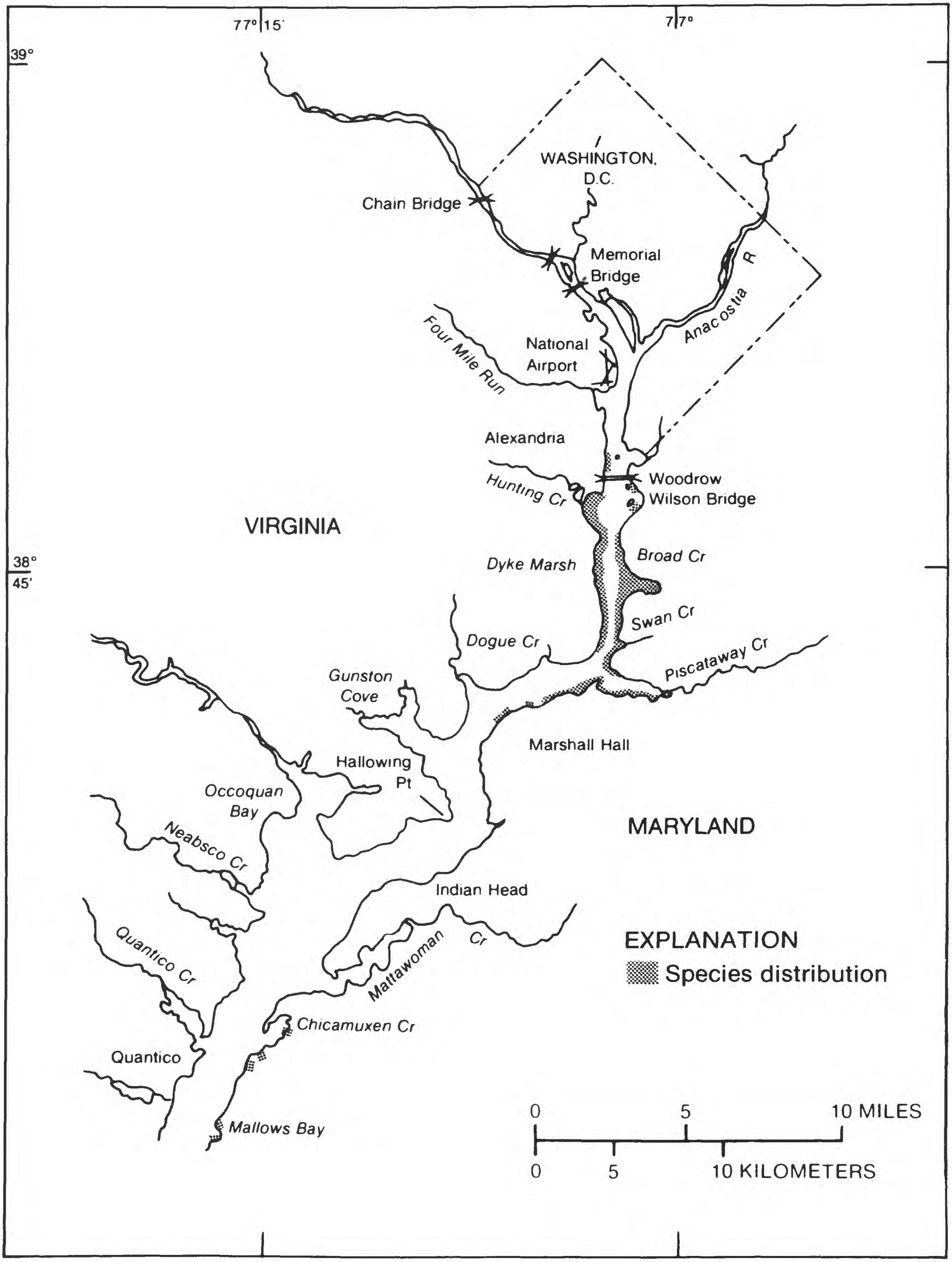

Figure B-7: Distribution of Hydrilla verticillata in the tidal Potomac River, 1984.

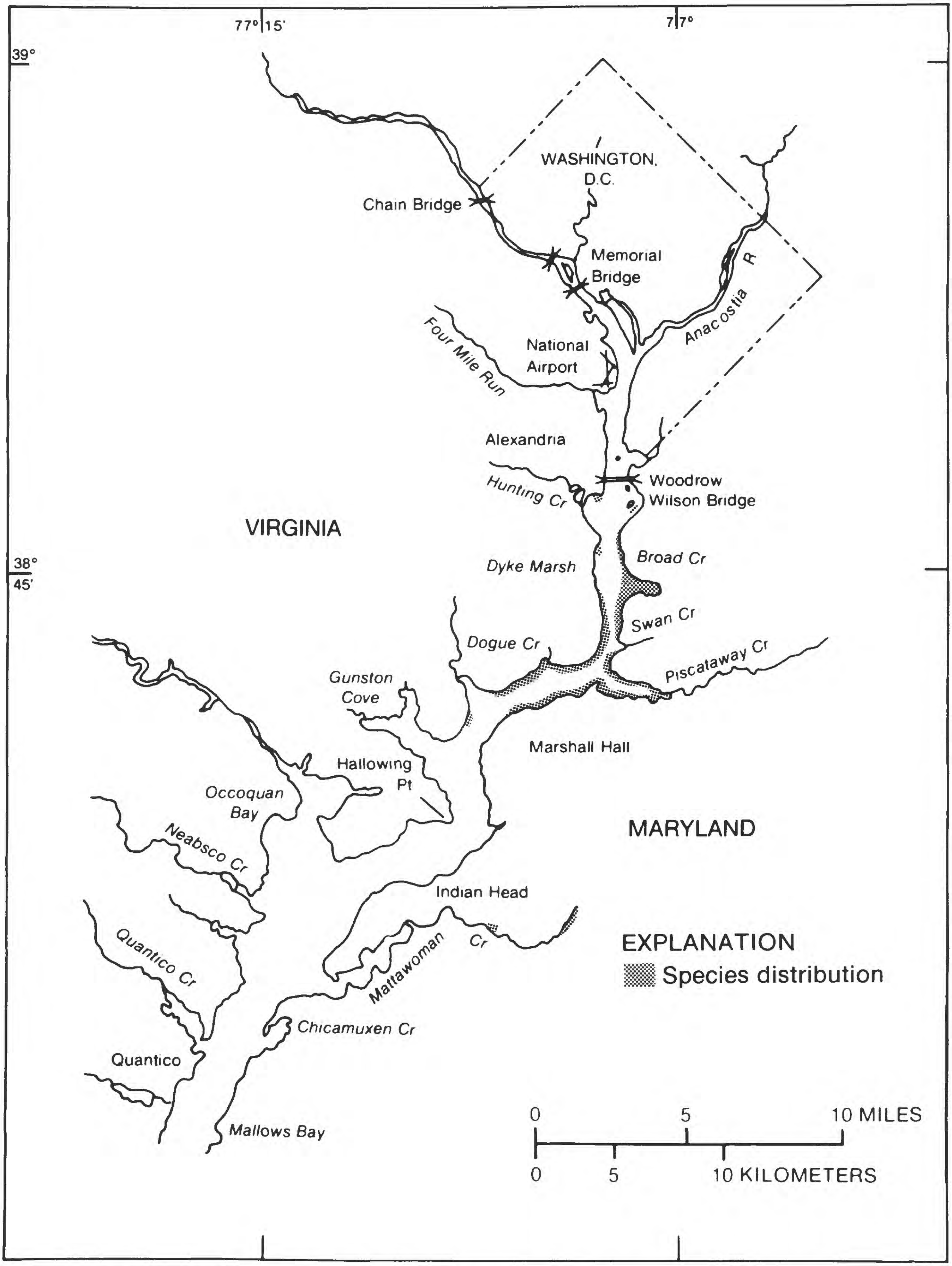

Figure B-8: Distibution of Myriophyllum spicatum in the tidal Potomac River, 1984.

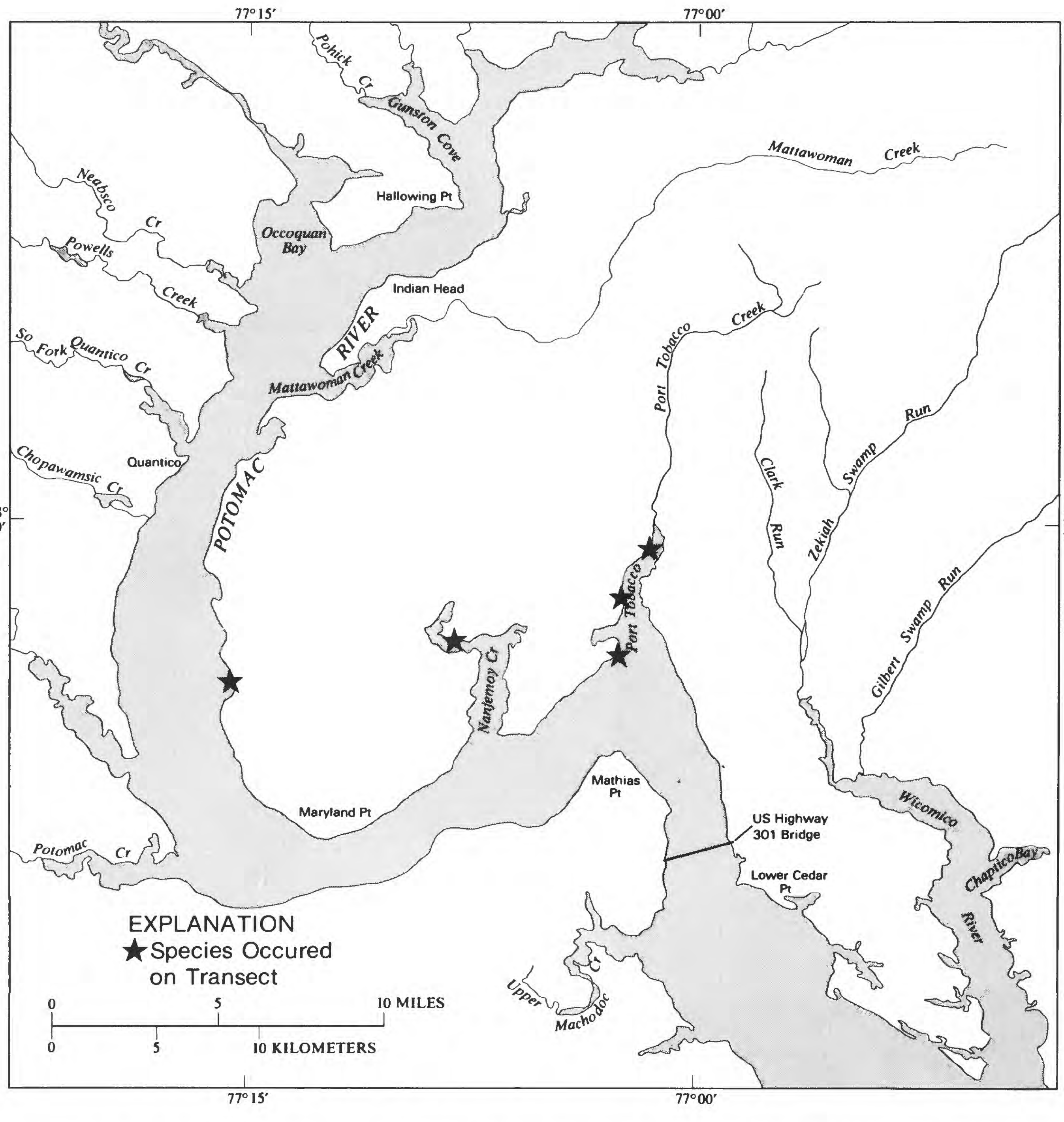

Figure B-9: Distribution of Myriophyllum spicatum in the transition zone and Potomac Estuary, 1984.

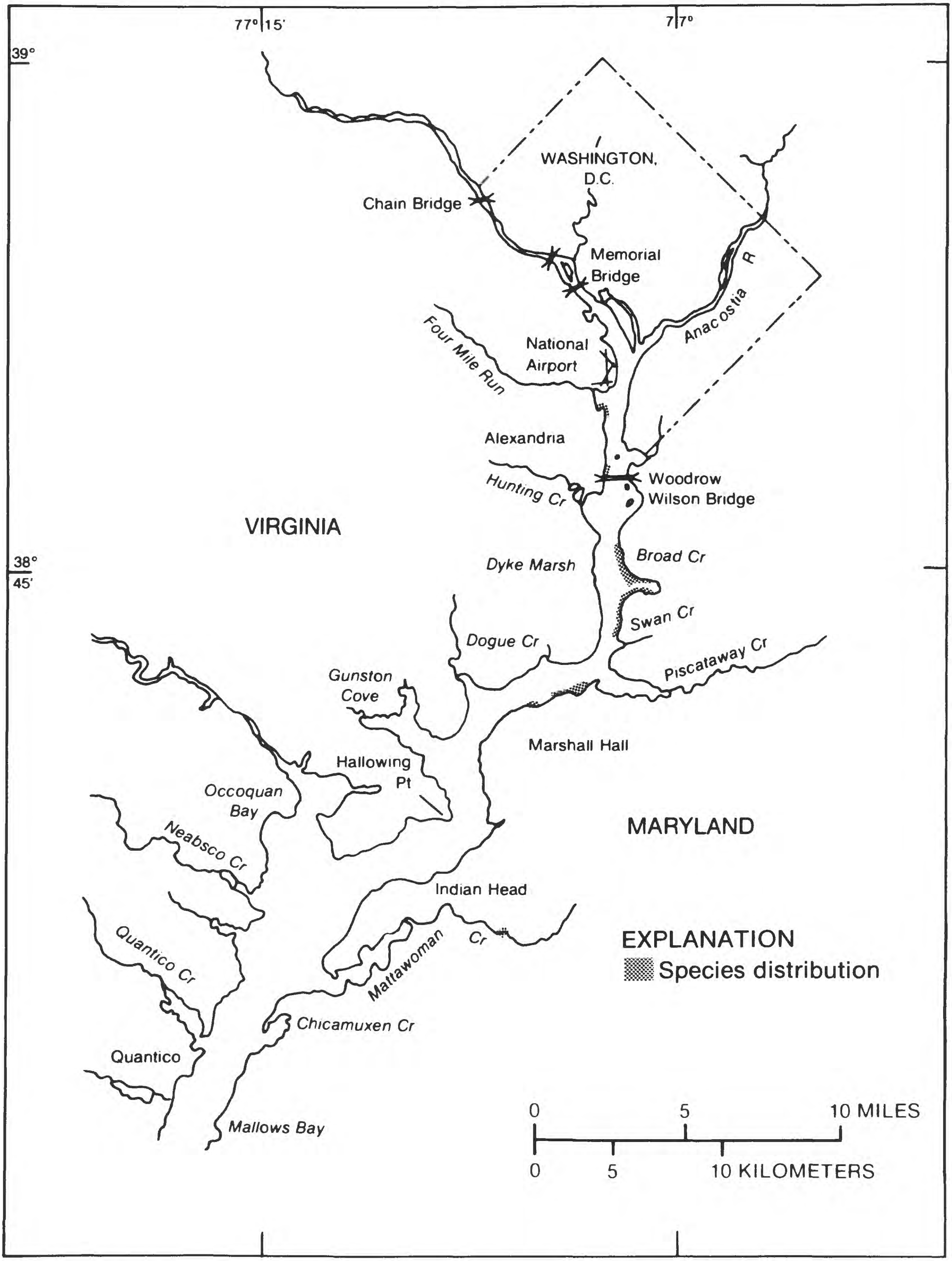

Figure B-10: Distribution of Najas sp. in the tidal Potomac River, 1984.

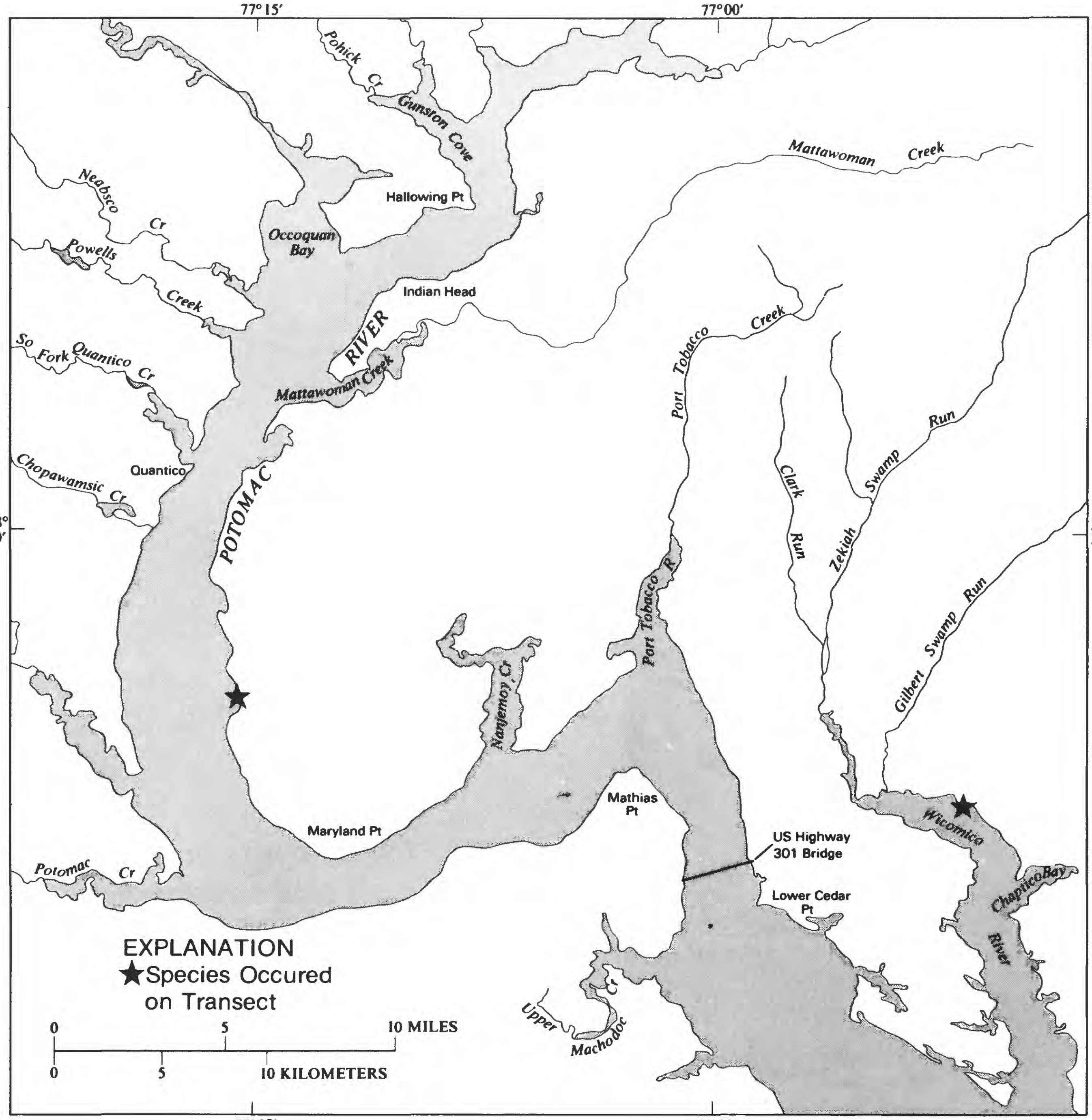

Figure B-11: Distribution of Najas sp. in the transition zone and Potomac Estuary, 1984.

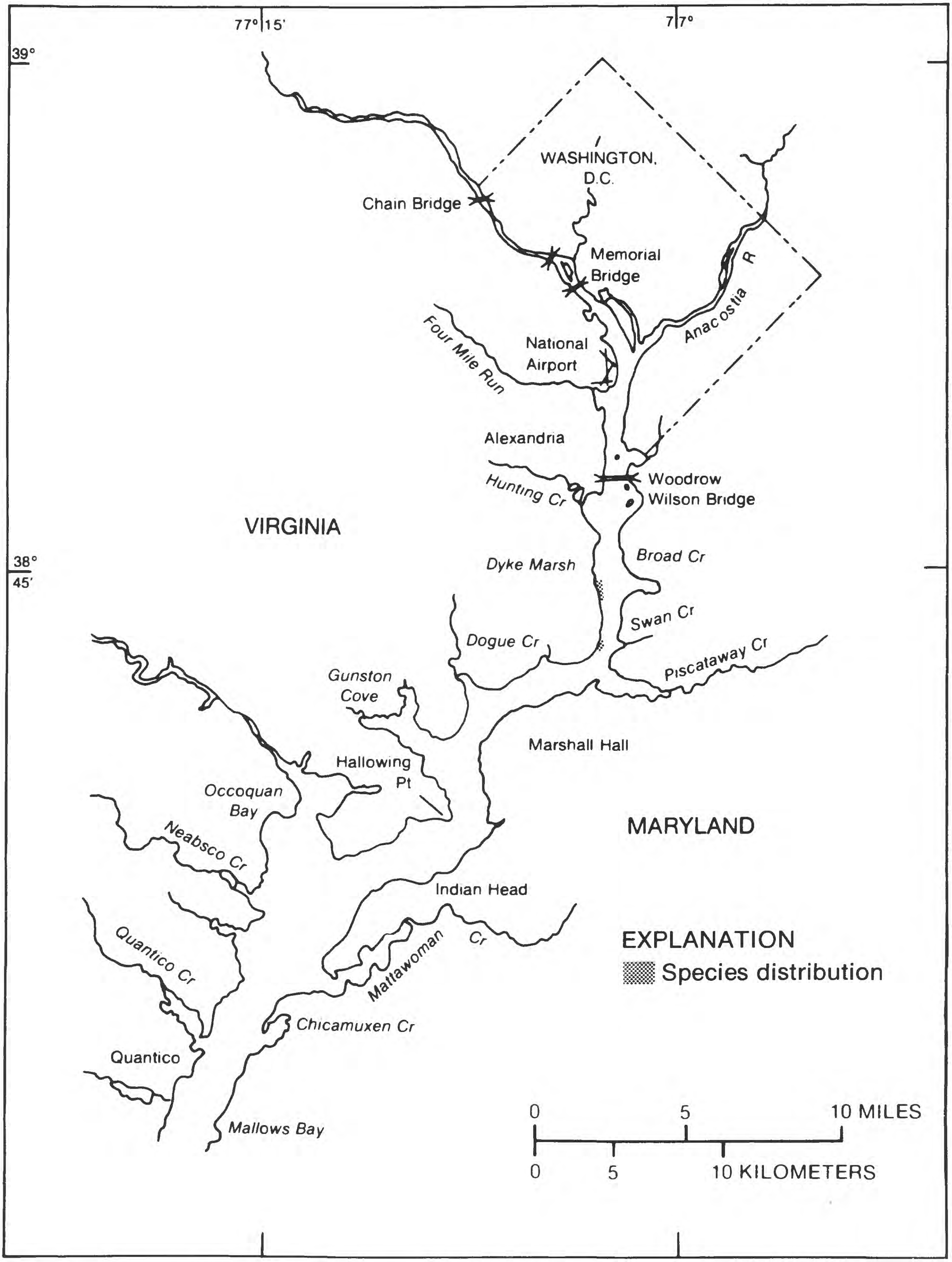

Figure B-12: Distribution of Nitella flexilis in the tidal Potomac River, 1984.

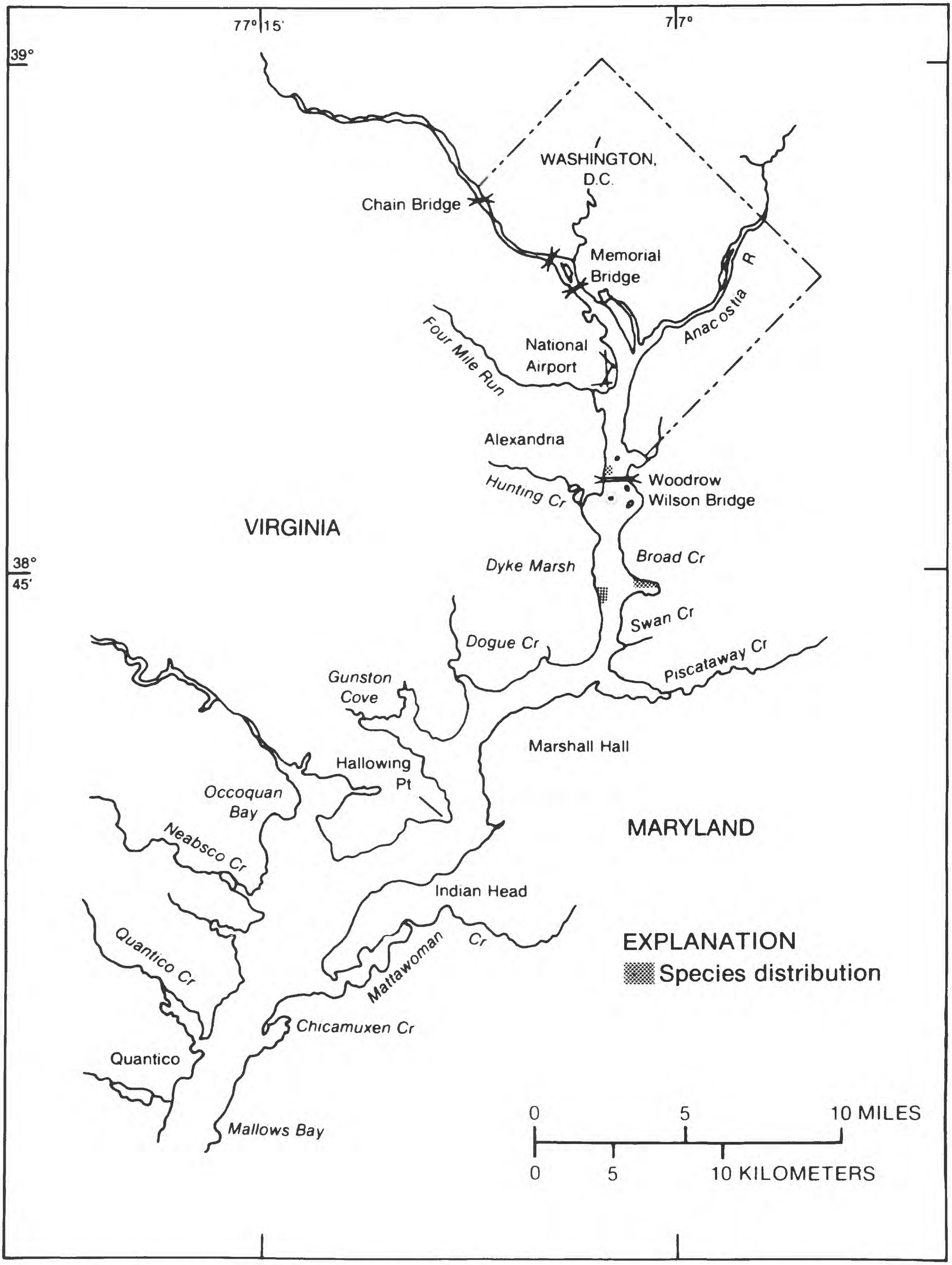

Figure B-13: Distribution of Potamogeton crispus in the tidal Potomac River, 1984.

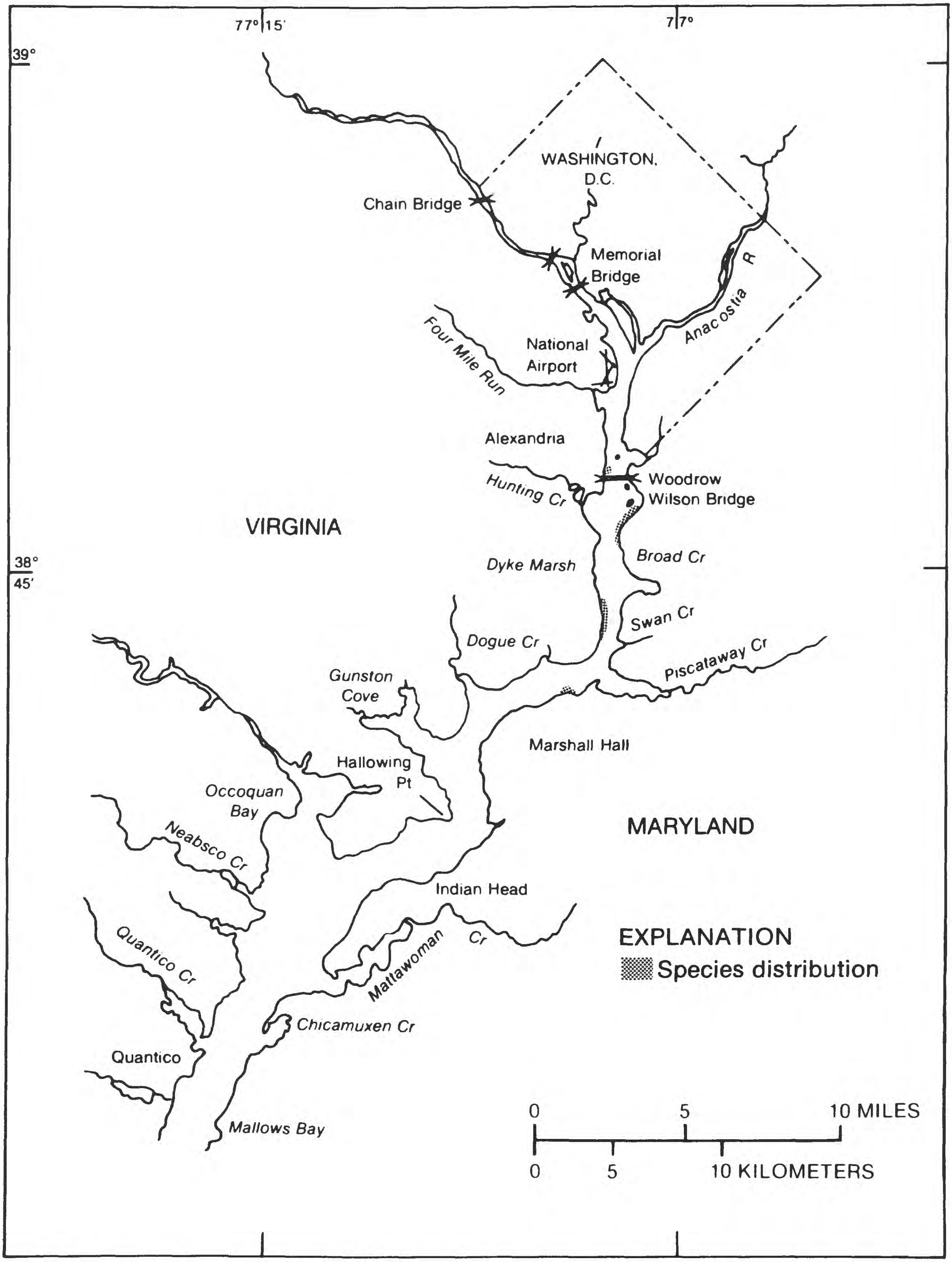

Figure B-14: Distribution of Potamogeton pectinatus in the tidal Potomac River, 1984.

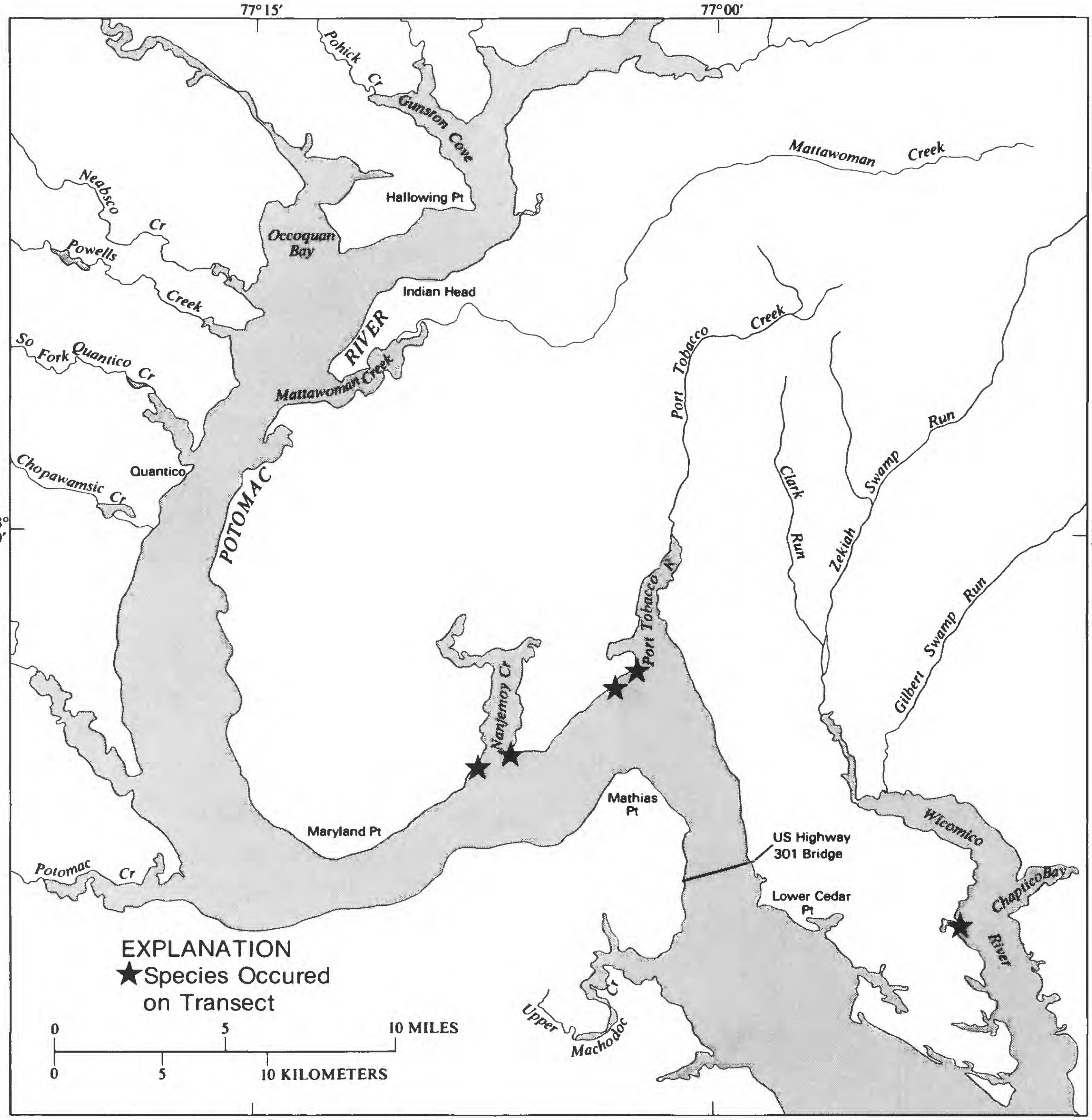

Figure B-15: Distribution of Potamogeton perfoliatus in the transition zone and Potomac Estuary, 1984.

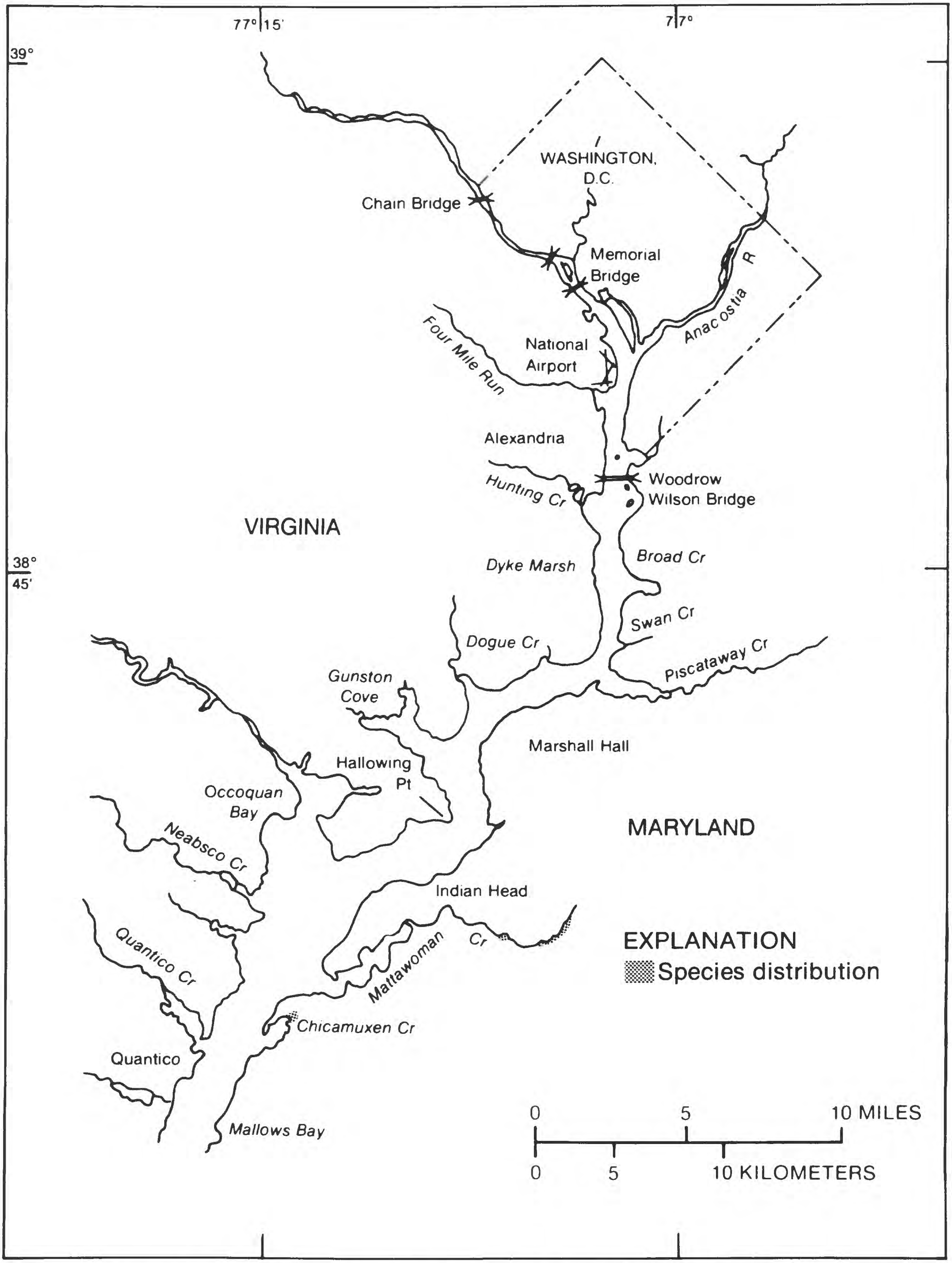

Figure B-16: Distribution of Potamogeton pusillus in the tidal Potomac River, 1984.

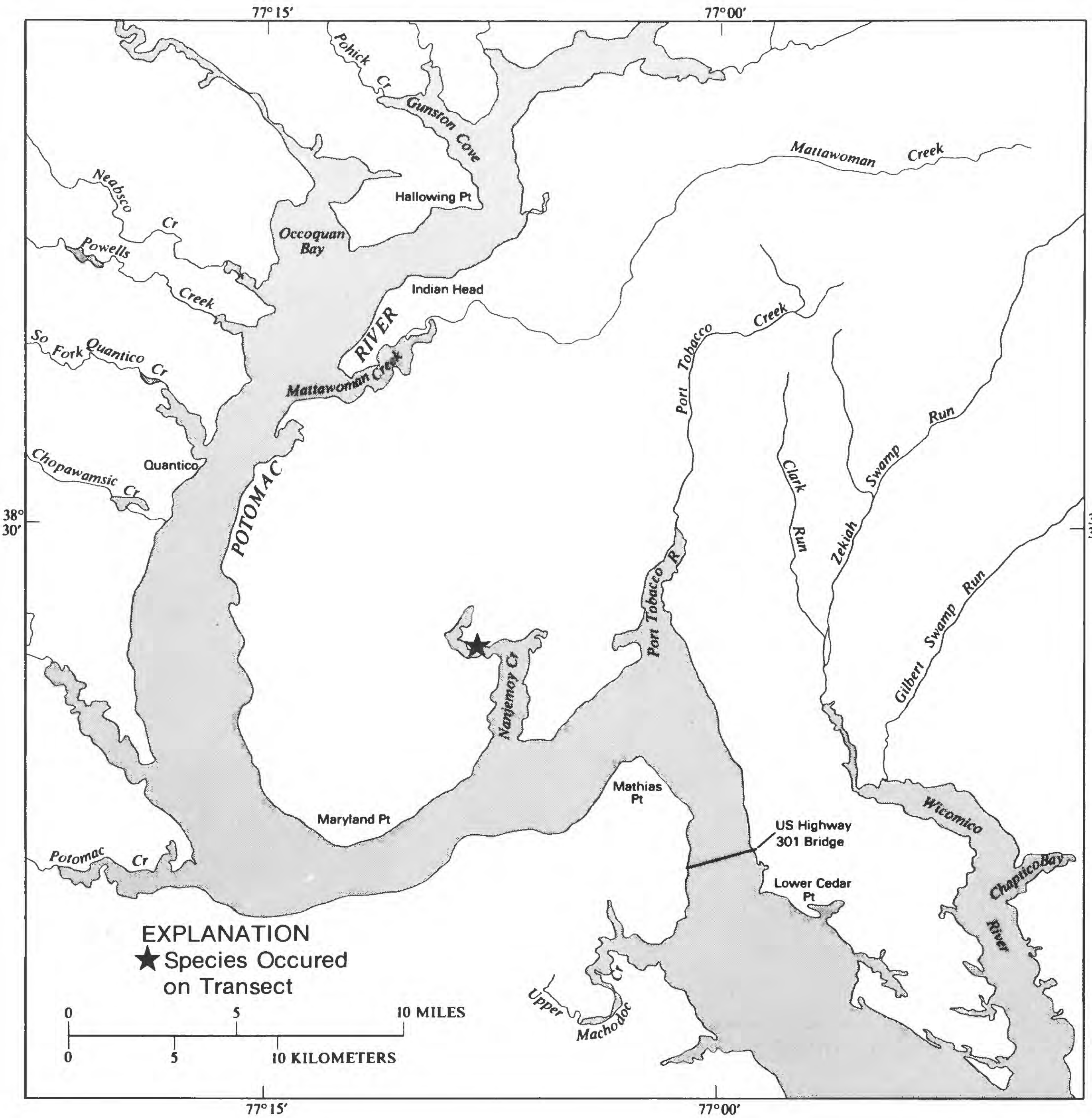

Figure B-17: Distribution of Potamogeton pusillus in the transition zone and Potomac Estuary, 1984.

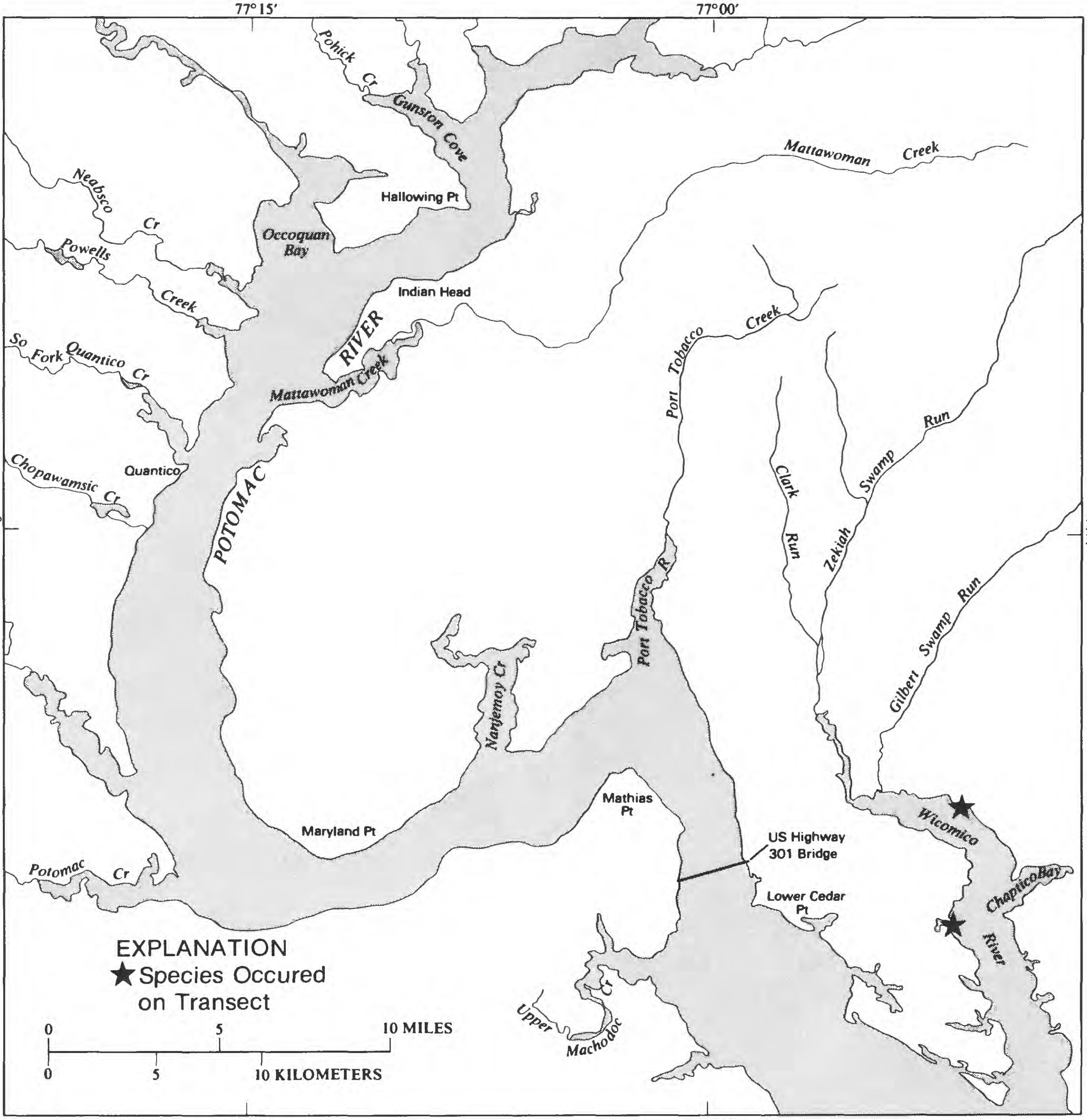

Figure B-18: Distribution of Ruppia maritima in the transition zone and Potomac Estuary, 1984.

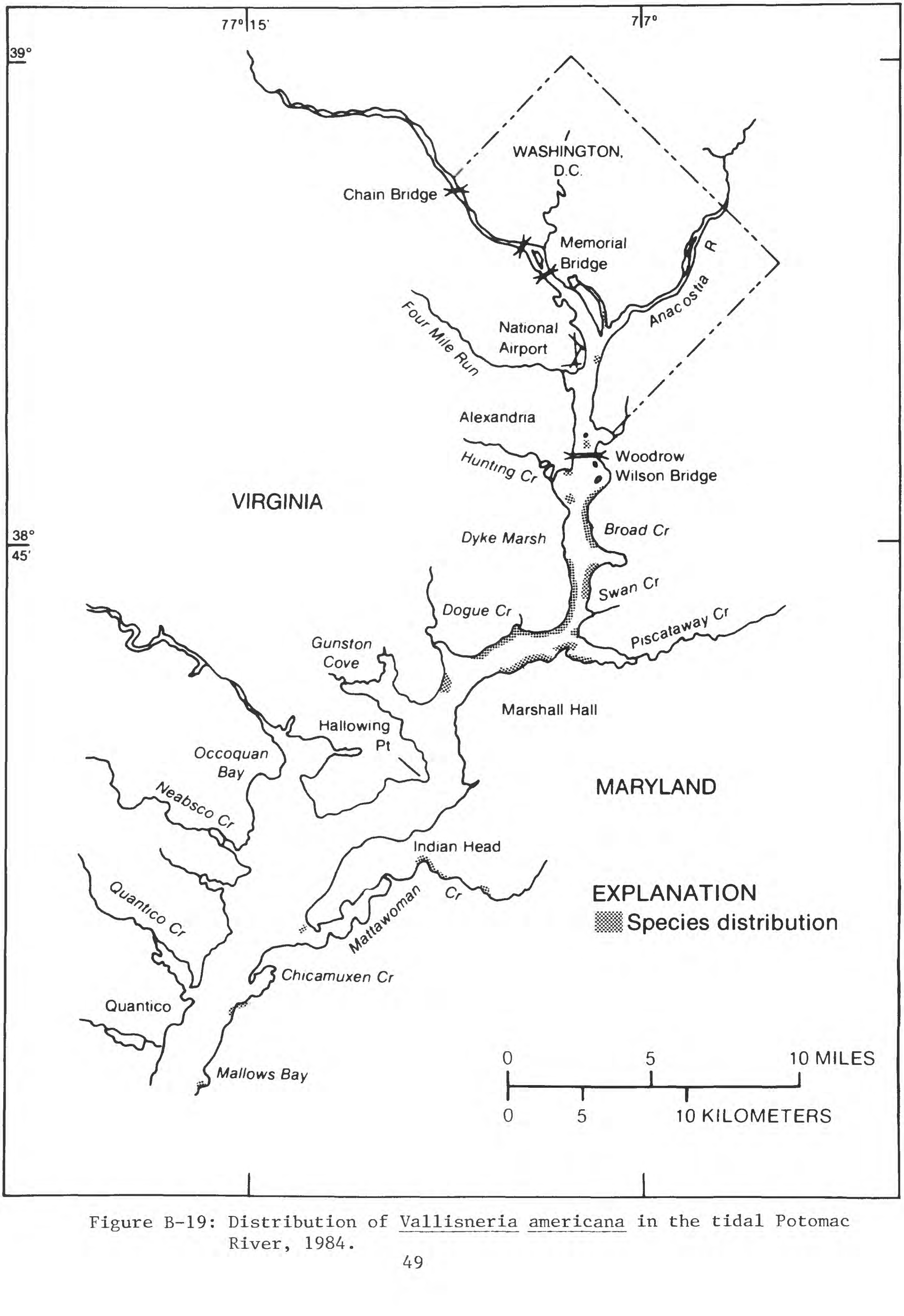

Figure B-19: Distribution of Vallisneria americana in the tidal Potomac River, 1984.

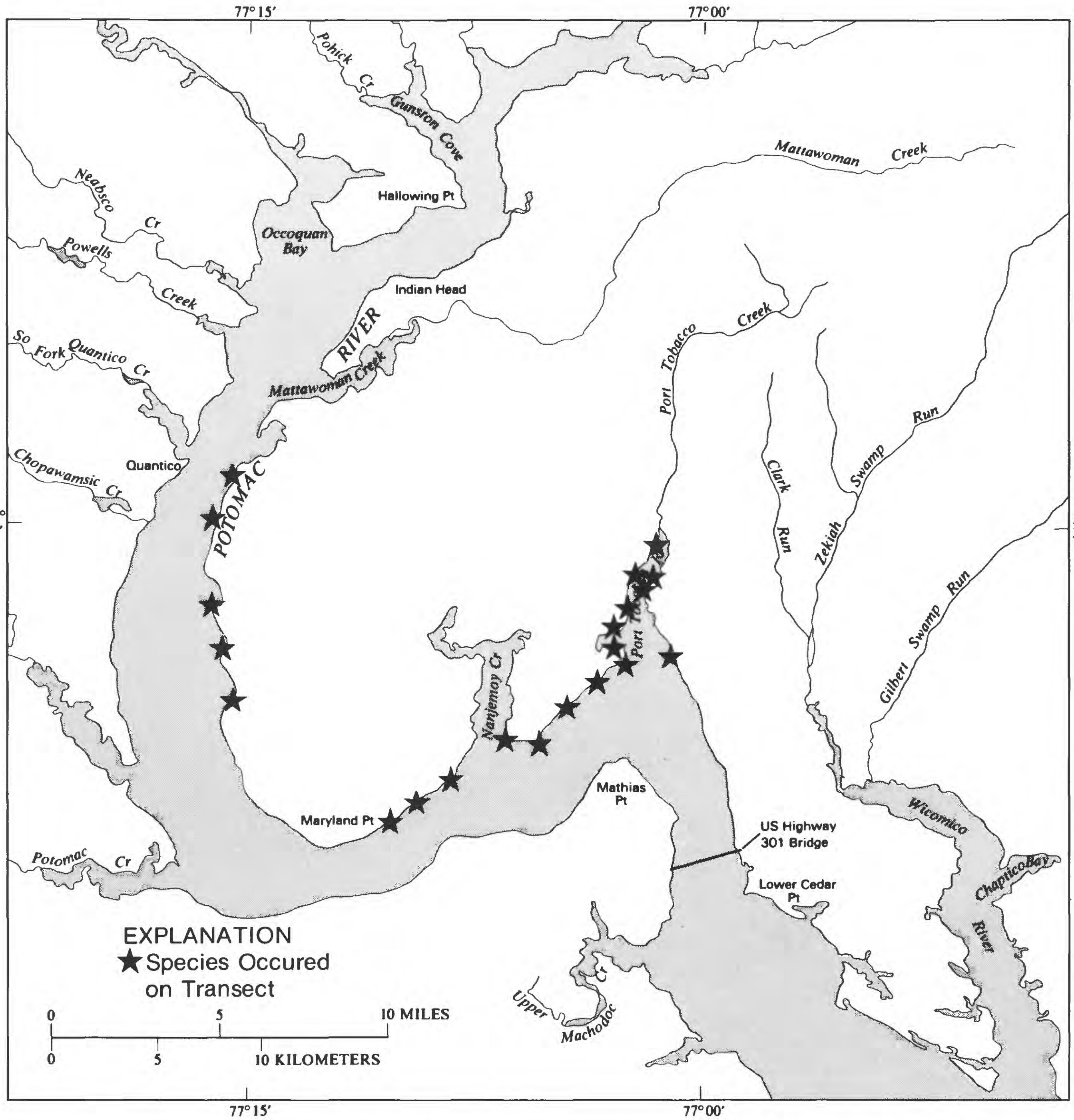

Figure B-20: Distribution of Vallisneria americana in the transition zone and Potomac Estuary, 1984.

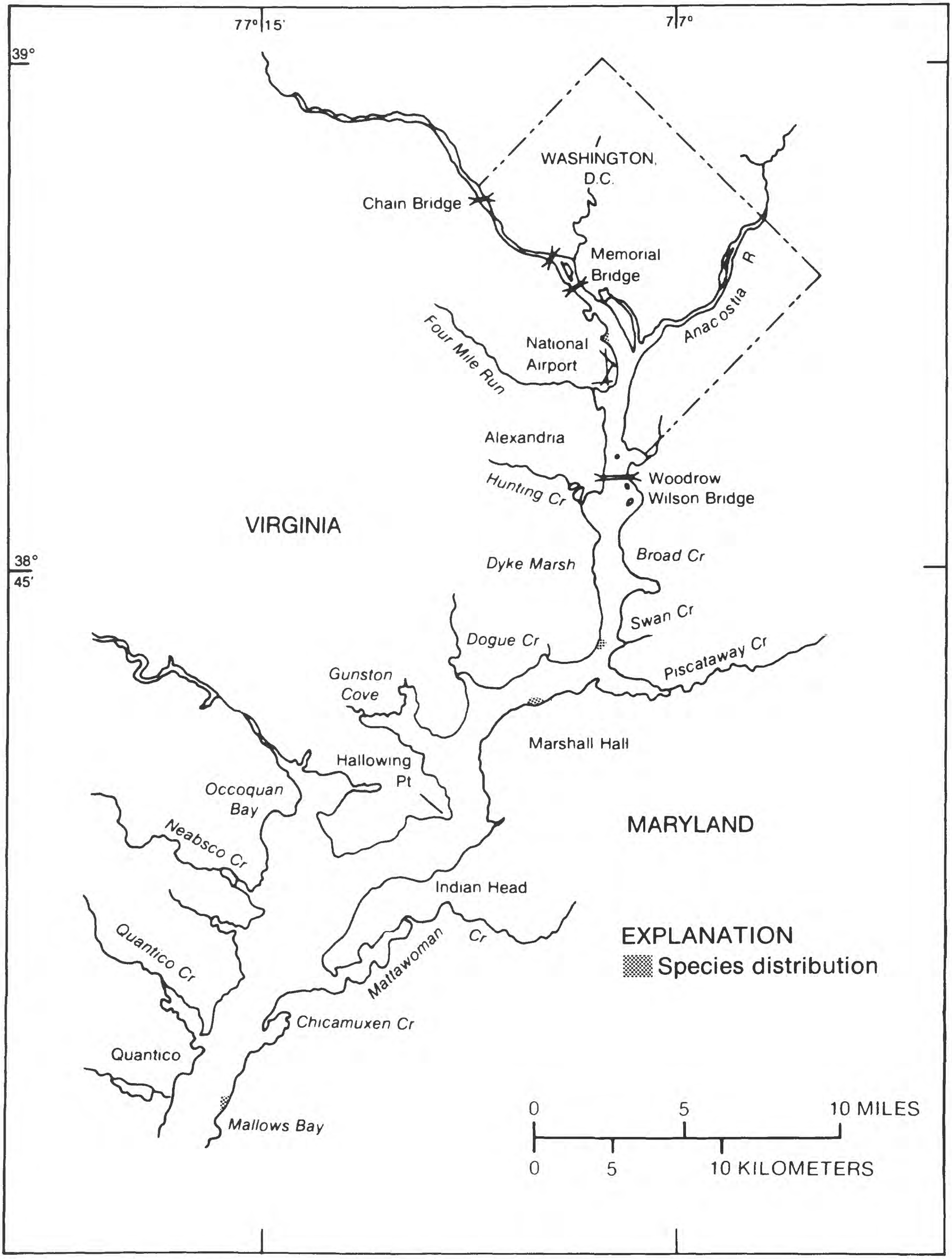

Figure B-21: Distribution of Zannichellia palustris in the tidal Potomac River, 1984.

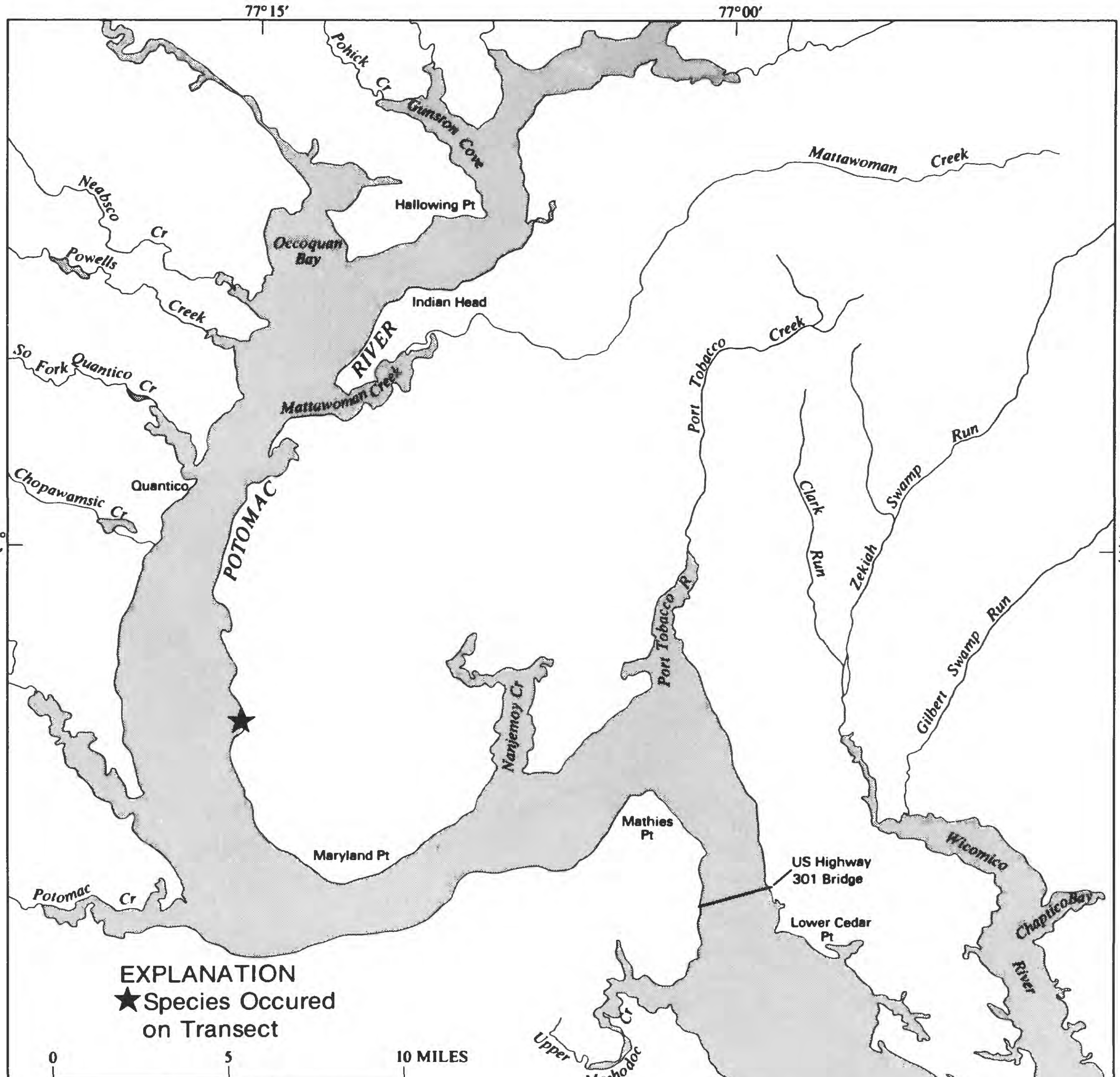

Figure B-22: Distibution of Zannichellia palustris in the transition zone and Potomac Estuary, 1984.

Appendix C. Water-quality data.

Table C-1.--Substrate types on transects in the tidal Potomac River, 1984. Substrates listed in order of proportion of constituent

Station	Depth (meters)	Distance from shore (meters)	Substrate	Vegetated?
RI-1R	0.5	3	sand	No
RI-1R	1.0	6	sand	No
RI-1R	1.5	15	silt clay	No
RI-1R	2.0	20	clay silt	No
RI-1R	2.5	30	clay silt	No
NA-2R-1	.8	5	clay silt	No
NA-2R-2	1.2	15	clay silt	No
NA-2R-3	1.7	30	clay silt	No
NA-2R-4	2.7	45	clay silt	No
OR-1R-1	.4	5	clay silt	Yes
OR-1R-2	.5	15	clay silt	Yes
OR-1R-3	.6	30	clay silt	Yes
OR-1R-4	.5	45	clay silt	Yes
OR-1R-5	.6	60	clay silt	Yes
OR-1R-6	1.4	75	clay silt	Yes
OR-1R-7	1.4	90	clay silt	No
OR-1R-8	1.5	105	clay silt	No
AD-1R-1	.4	5	clay silt	Yes
AD-1R-2	.6	15	clay silt	Yes
AD-1R-3	.8	30	clay silt	Yes
AD-1R-4	2.0	45	clay silt	No
DM-1R-1	.4	5	boulders	No
DM-1R-2	.7	15	cobbles	Yes
DM-1R-3	1.6	30	clay silt	Yes
DM-1R-4	1.7	45	clay silt	Yes
DM-1R-5	2.0	60	clay silt	Yes
DM-1R-6	2.0	75	clay silt	No
DM-1R-7	2.0	90	clay silt	Yes
DM-1R-8	2.5	105	clay silt	No
DM-1R-9	2.6	120	clay silt	No
DM-2R-1	.5	3	clay silt detritus	Yes
DM-2R-2	1.3	13	clay silt	Yes
DM-2R-3	2.2	28	clay silt	Yes
DM-2R-4	2.2	43	clay silt	No
DM-2R-5	2.5	58	clay silt	No
DM-3R-1	.6	5	clay silt	Yes
DM-3R-2	.85	15	clay silt	Yes
DM-3R-3	1.3	30	clay silt	Yes
DM-3R-4	1.6	45	clay silt	Yes
DM-3R-5	1.7	60	clay silt	No
DM-4R-1	.1	5	clay silt	Yes
DM-4R-2	.1	15	clay silt	Yes
DM-4R-3	.4	30	clay silt	Yes
DM-4R-4	.6	45	clay silt	Yes

Table C-1.--Substrate types on transects in the tidal Potomac River, 1984
--continued.

Substrates listed in order of proportion of constituent; n.d. is no data available

Station	Depth (meters)	Distance from shore (meters)	Substrate	Vegetated?
DM-4R-5	0.9	60	clay silt	Yes
DM-4R-6	1.1	75	clay silt	No
DM-4R-7	1.5	90	clay silt	No
DM-4R-8	1.6	105	clay silt	No
BB-1R-1	.5	1	rocks	No
BB-1R-2	1.0	n.d.	sand	No
BB-1R-3	1.5	n.d.	sand	No
BB-1R-4	2.0	n.d.	sand	No
BB-1R-5	2.5	n.d.	sand	No
BC-1T-1-1	.5	5	clay silt cobbles	Yes
BC-1T-1-2	1.0	15	clay silt	Yes
BC-1T-1-3	1.0	30	clay silt	Yes
BC-1T-1-4	1.0	45	clay silt	Yes
BC-1T-1-5	1.1	60	clay silt	Yes
BC-1T-1-6	1.0	75	clay silt	Yes
BC-1T-1-7	1.2	90	clay silt	Yes
BC-1T-1-8	1.3	105	clay silt	Yes
BC-1T-1-9	1.4	120	clay silt	No
BC-1T-1-10	1.5	135	clay silt	No

Table C-2.--Secchi depths in the tidal Potomac River, July-October, 1983

Nearest transect	Date	Secchi depth (centimeters)	Nearest transect	Date	Secchi depth (centimeters)
OR-1R	October 4	78	WC-1R	July 2	83
DM-1R	October 4	28	WC-1R	July 8	85
DM-1.5R	August 3	128	PY-1R	July 7	37
DM-1.5R	August 3	80	PY-1R	July 8	55
DM-1.5R	August 4	74	PY-1R	July 10	65
DM-1.5R	August 4	74	PY-1R	July 12	100
DM-1.5R	August 4	56	PY-1R	July 15	75
DM-1.5R	October 4	114	PY-1R	July 21	100
DM-3R	August 4	90	PY-1R	August 4	117
DM-4R	July 21	145	PY-1R	August 9	89
DM-4R	August 4	168	PY-1R	October 8	95
DM-4R	August 4	120	PY-1.5R	August 9	94
DM-4R	August 4	100	PY-1.5R	August 9	110
GC-1R	July 21	113	PY-1.5R	August 4	144
GC-1R	July 21	50	PY-2R	August 9	110
GC-1R	July 21	42	PY-2R	August 9	61
GC-1R	July 21	63	PY-3R	July 29	45
GC-1R	August 4	50	PY-3R	August 9	94
GC-2R	July 21	85	PY-3R	August 9	128
GC-2R	July 21	86	PY-4R	August 4	93
GC-2R	August 4	100	PY-4R	August 4	95
GC-3R	July 21	50	PY-7R	August 4	59
GC-4R	August 4	82	PY-8R	July 2	107
GC-4R	August 4	94	PY-8R	July 2	127
GC-5R	August 4	50	PY-8R	August 4	63
GC-5R	August 4	46	PY-8R	August 4	50
GC-5R	August 4	50	PY-9R	August 4	56
GC-6R	August 4	55	PY-9R	August 4	43
GC-6R	August 4	37	PY-10R	August 4	38
NB-1R	August 2	34	MN-4T-1	August 2	42
NB-1R	August 2	42	MN-4T-1	August 2	45
			MN-9R	August 2	34

Table C-3.--Secchi depths in the tidal Potomac River, July-October, 1984

Nearest transect	Date	Secchi depth (centimeters)	Nearest transect	Date	Secchi depth (centimeters)
RI-1R	August 8	76	WC-1R	August 8	56
OR-1R	July 19	25	GI-1R	July 3	62
DM-1R	July 31	54	PY-1R	July 3	82
DM-1.5R	June 19	135	PY-1.5R	October 5	193
DM-1.5R	July 3	89	PY-2R	August 2	111
DM-1.5R	July 12	74	BC-1T-1	July 24	45
DM-1.5R	October 3	69	BC-1T-1	October 3	156
DM-1.5R	November 7	122	PY-4R	July 31	41
DM-3R	July 6	80	PY-6R	July 6	86
DM-3R	July 24	98	PY-6R	July 31	62
DM-3R	July 24	66	PY-8R	June 20	64
DM-3R	August 14	107	PY-8R	July 6	66
DM-3R	September 6	107	PY-8R	July 31	89
DM-3R	October 3	153	PY-9R	July 31	76
DM-3R	November 8	132	PM-1R	July 31	43
DM-4R	July 20	108	PM-4R	July 27	65
DM-4R	August 14	106	NB-1R	July 23	34
DM-4R	August 14	87	NB-1R	July 23	28
DM-4R	September 6	117	NB-1R	July 26	33
DM-4R	October 3	69	NB-1R	July 26	30
DM-4R	November 8	136	NB-1R	July 27	43
GC-1R	July 20	59	NB-1R	July 27	69
GC-2R	July 19	96	MN-1R	July 27	58
GC-2R	July 20	61	MN-1R	July 27	58
GC-2R	July 23	88	MN-4R	August 1	73
GC-3R	June 19	64	MN-4T-2	June 19	39
GC-3R	June 19	60	MN-4T-2	June 20	53
GC-3R	July 20	79	MN-4T-2	October 19	71
GC-3R	July 23	97	MN-3T-2	August 1	43
GC-3R	July 23	70	MN-9R	August 1	48
GC-5R	July 23	74	MN-9R	August 1	40
GC-1T-3	July 23	48	MN-10R	August 21	88
GC-8R	July 23	73	MN-10R	August 21	63
GC-10R	July 27	30	MP-2R	August 21	60

Table C-4:--Secchi depth, specific conductance, temperature and sampling time on transects in the tidal Potomac River and Estuary, June 1984

Secchi is Secchi depth in centimeters; Cond is specific conductance in micromhos; Temp is temperature in degrees Celsius

Transect	River km	Date	Secchi	Cond	Temp	Time
DM-4R	160.4	6/13/84	129	310	31	15:40
GC-1R	156.1	6/13/84	44	320	30	
GC-2R	154.2	6/13/84	64	285	32	16:30
GC-3R	152.4	6/13/84	49	300	32	
GC-4R	151.1	6/19/84	63	270	29	
GC-5R	149.1	6/19/84	48	300	28	
GC-6R	147.9	6/19/84	64	290	28	
GC-7R	146.7	6/19/84	64	280	30	13:42
GC-8R	143.0	6/19/84	62	260	30	14:00
GC-9R	141.1	6/19/84	44	260	30	
GC-10R	139.5	6/19/84	50	250	34	14:35
GC-1T-1	2.3	6/19/84	50	280	27	
GC-1T-2	2.8	6/19/84	50	280	30	
GC-1T-3	2.7	6/19/84	50	300	32	
WC-1R	176.9	6/11/84	193	300	28	9:23
PY-1R	166.0	6/11/84	90	350	32	13:39
PY-2R	163.9	6/13/84	120	300	29	
PY-3R	162.0	6/13/84	109	320	30	10:40
PY-4R	160.4	6/13/84	95	295	29	
PY-5R	158.7	6/13/84	89	290	28	
PY-6R	157.9	6/11/84	64	310	29	16:33
PY-7R	156.0	6/11/84	64	320	28.5	16:00
PY-8R	154.2	6/11/84	69	290	29	14:48
PY-9R	152.2	6/11/84	50	310	29	15:30
PY-10R	149.2	6/11/84	50	280	29	
PY-1T-1	2.0	6/13/84	61	290	29	8:00
PY-1T-2	2.3	6/13/84	76	290	29	
PY-2T-1	3.0	6/13/84	55	300	29	
PM-1R	147.9	6/19/84	50	270	30	15:44
PM-2R	146.0	6/19/84	60	270	29	
PM-3R	144.1	6/19/84	64	270	29	
PM-4R	142.7	6/19/84	64	280	30	14:52
MN-1R	141.0	6/22/84	76	295	28	11:36
MN-2R	139.1	6/22/84	84	275	27	11:46
MN-3R	138.0	6/22/84	108	275	28	
MN-4R	134.4	6/20/84	75	260	29	16:00
MN-5R	133.1	6/20/84	48	240	28	
MN-6R	131.9	6/22/84	65	230	28	12:44
MN-7R	130.4	6/22/84	50	220	27	13:10

Table C-4.--Secchi depth, specific conductance, temperature and sampling time on transects in the tidal Potomac River and Estuary, June 1984--continued

Secchi is depth in centimeters; Cond is conductance in micromhos; Temp is temperature in degrees Celsius

Transect	River km	Date	Secchi	Cond	Temp	Time
MN-8R	128.6	6/22/84	48	225	27	13:30
MN-9R	128.6	6/22/84	52	225	27	14:31
MN-10R	124.2	6/22/84	69	230	29	15:10
MN-1T-2	1.7	6/20/84	32	200	28	
MN-1T-3	1.5	6/20/84	43	210	27	9:30
MN-2T-1	3.3	6/20/84	30	210	30	15:20
MN-2T-3	3.3	6/20/84	44	210	29	10:00
MN-3T-1	4.3	6/20/84	33	200	27	11:10
MN-3T-2	4.5	6/20/84	43	200	29	
MN-3T-3	3.6	6/20/84	38	210	28	
MN-4T-1	6.8	6/20/84	44	160	29	
MN-4T-2	7.0	6/20/84	53	145	28	14:00
MP-1R	122.6	6/22/84	89	260	29	15:35
MP-2R	119.6	6/22/84	80	300	27	16:10
MP-3R	118.0	6/22/84	85	390	28	16:30
MP-4R	116.9	6/22/84	89	370	27	17:00

Table C-5:--Secchi depth, specific conductance, temperature and sampling time on transects in the tidal Potomac River and Estuary, September 1984

Secchi is Secchi depth in centimeters; Cond is specific conductance in micromhos; Temp is temperature in degrees Celsius

Transect	River (km)	Date	Secchi	Cond	Temp	Time
RI-1R	180.0	9/10/84	90	290	24	11:00
OR-1R	174.0	9/10/84	62	290	25	09:45
DM-1R	167.0	9/10/84	106	280	23	07:50
GC-1R	156.1	9/18/84	109			11:50
GC-2R	154.2	9/18/84	105			11:34
GC-3R	152.4	9/18/84	67			11:14
GC-4R	151.1	9/18/84	82			11:10
GC-5R	149.1	9/18/84	63			
GC-6R	147.9	9/18/84	47			
GC-7R	146.7	9/18/84	63			
GC-8R	143.0	9/18/84	65			09:25
GC-9R	141.1	9/18/84	41			09:10
GC-1T-1	2.3	9/18/84	48			09:00
NP-2R	99.5	9/20/84	75	5800	23	10:10
NP-3R	97.8	9/20/84	80	5500	25	10:32
NP-4R	96.3	9/20/84	54	6000	25	10:55
NP-5R	95.0	9/20/84	72	6000	24	11:31
NP-6R	94.0	9/20/84	66	7000	26	14:08
NP-7R	92.0	9/20/84	73	8000	25	14:44
NP-8R	90.0	9/20/84	44	9000	25	15:19
NP-9R	88.3	9/20/84	51	9000	25	15:47
NP-10R	87.6	9/20/84	48	9000	26	16:17
NP-11R	87.2	9/27/84	73			11:05
NY-3T-3	5.5	9/20/84	61	4500	23	12:33
PO-1T-4	2.3	9/27/84	57			10:45
PO-2T-3	3.4	9/27/84	40			09:55
WO-2T-2	3.9	9/27/84	64			
WO-3T-2	5.4	9/27/84	45			16:15
WO-5T-1	9.7	9/27/84	56			
WO-7T-2	12.9	9/27/84	48			1340
WO-8T-1	15.3	9/27/84	42			14:00
WO-9T-1	16.9	9/27/84	41			15:30
BB-1R	175.0	9/10/84	75	280	24	12:20
PY-1R	166.0	9/17/84	173			11:15
PY-5R	158.7	9/18/84	129			13:00
PY-6R	157.9	9/18/84	160			13:31
PY-9R	152.2	9/18/84	102			15:20
PY-10R	149.2	9/18/84	91			
PY-1T-2	2.3	9/17/84	74			09:45
MN-1R	141.0	9/13/84	72	200	25	15:25
MN-2R	139.1	9/13/84		200	25	14:59
MN-3R	138.0	9/13/84	60	200	25	14:50
MN-4R	134.4	9/13/84	69	200	25	14:36

Table C-5:--Secchi depth, specific conductance, temperature and sampling time on transects in the tidal Potomac River and Estuary, September 1984--continued

Secchi is Secchi depth in centimeters; Cond is specific conductance in micromhos; Temp is temperature in degrees Celsius

Transect	River (km)	Date	Secchi	Cond	Temp	Time
MN-5R	133.1	9/13/84	67	190	24	14:15
MN-6R	131.9	9/13/84	46	190	24	12:20
MN-7R	130.4	9/13/84	46	185	24	12:41
MN-8R	128.6	9/13/84	57	185	24	12:52
MN-9R	128.6	9/13/84	57	200	25	13:00
MN-10R	124.2	9/13/84	64	250	26	13:40
MN-1T-3	1.5	9/13/84	40	180	28	08:17
MN-2T-1	3.3	9/13/84	35	180	23.5	09:28
MN-2T-3	3.3	9/13/84	38	160	23.5	09:43
MN-3T-2	4.5	9/13/84	38	220	23.5	10:07
MN-4T-2	7.0	9/13/84	36	180	24	12:20