DATA ON THE DISTRIBUTION AND ABUNDANCE OF SUBMERSED AQUATIC VEGETATION IN THE TIDAL POTOMAC RIVER AND ESTUARY, MARYLAND, VIRGINIA, AND THE DISTRICT OF COLUMBIA, 1986

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By Nancy B. Rybicki, R.T. Anderson, J.M. Shapiro,
K.L. Johnson, and C.L. Schulman

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CONVERSION FACTORS

For the convenience of readers who prefer inch-pound units rather than the metric (International System) units used in this report, the following conversion factors may be used:

Multiply metric unit	By	To obtain inch-pound unit
meter (m)	3.281	foot (ft)
square meter (m^2)	11.11	square foot (ft^2)
centimeter (cm)	0.3937	inch (in)
square centimeter (cm^2)	0.1550	square inch (in^2)
kilometer (km)	0.6214	mile (mi)
kilometer (km)	0.5405	nautical mile (nm)
hectare (ha)	2.471	acre

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

$$°F = 9/5\ (°C) + 32$$

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By Nancy B. Rybicki, R. T. Anderson, J. M. Shapiro, K. L. Johnson, and C. L. Schulman

ABSTRACT

This report summarizes data on the distribution and abundance of submersed aquatic vegetation collected in the tidal Potomac River and Estuary during 1986. Plant species were identified and dry weight determined for selected sites sampled in spring and fall. The percentage of each plant species was determined in areas of high plant density in the fall. Water-quality characteristics measured include temperature, specific conductance, dissolved oxygen, pH, and transparency as indicated by Secchi depth. Maps were made of the distribution of submersed aquatic vegetation based on transect samples and a complete shoreline survey.

INTRODUCTION

A 1978-81 survey of submersed aquatic vegetation in the tidal Potomac River and Estuary showed that the tidal river was nearly devoid of submersed aquatic plants (Pascal and others, 1982; Haramis and Carter, 1983; Carter and others, 1983, 1985). In 1983, numerous species of submersed aquatic plants returned to the tidal river after an absence of decades. In 1983, the U.S. Geological Survey began a new study of distribution and abundance of submersed aquatic vegetation concentrating on the tidal Potomac River and transition zone of the estuary. The data collected between 1983-85 were summarized in Carter and others (1985), Orth and others (1985, 1986), Rybicki and others (1985, 1986), Carter and Rybicki (1987). The objectives of the 1986 data-collection study were:

1. To collect and identify all species of submersed aquatic plants found in the tidal river and estuary;
2. To use 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 previous surveys to quantify changes in biomass, species composition and water quality for 1984, 1985, and 1986;
4. To monitor the spread of *Hydrilla verticillata* in the tidal river; and

This open-file report presents the data collected during 1986.

Acknowledgements

This work was partially supported by the U.S. Army Corps of Engineers, Baltimore District. We thank all our colleagues in the National Park Service; Virginia State Water Control Board; Department of Natural Resources, Maryland; and the Government of the District of Columbia for their assistance.

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 freshwater 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 to 18 mg/L (milligrams per liter) 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 mg/L 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

A shoreline survey for submersed aquatic vegetation in the tidal river and tributaries was conducted in September and October of 1986. This survey was done by boat, at low tide, using rakes to gather samples and to check whether vegetation was rooted or floating. The proportion of each species in vegetated areas was estimated and referenced to 1 kilometer grids shown on U.S. Geological Survey 7½ minute topographic maps with bathymetry added. These data were supplied to the U.S. Environmental Protection Agency for use in their Chesapeake Bay-wide status report on submersed aquatic vegetation (Orth and others, 1987). The distribution information was transferred to a small-scale map for publication in this report.

In addition to the shoreline survey, 172 transects that were sampled during the 1978-81, 1984, and 1985 studies were resampled. The tidal-river and transition-zone transects (figs. 2 and 3) were sampled in June (spring) and September-October (fall) 1986, except Maryland Point which was sampled in September only. The estuary was sampled in July (summer) (figs. 3 and 4). Sampling methods (Paschal and others, 1982) are summarized here for the reader's convenience. Transects were sampled 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, the fixed interval sampling was not used. Instead, samples

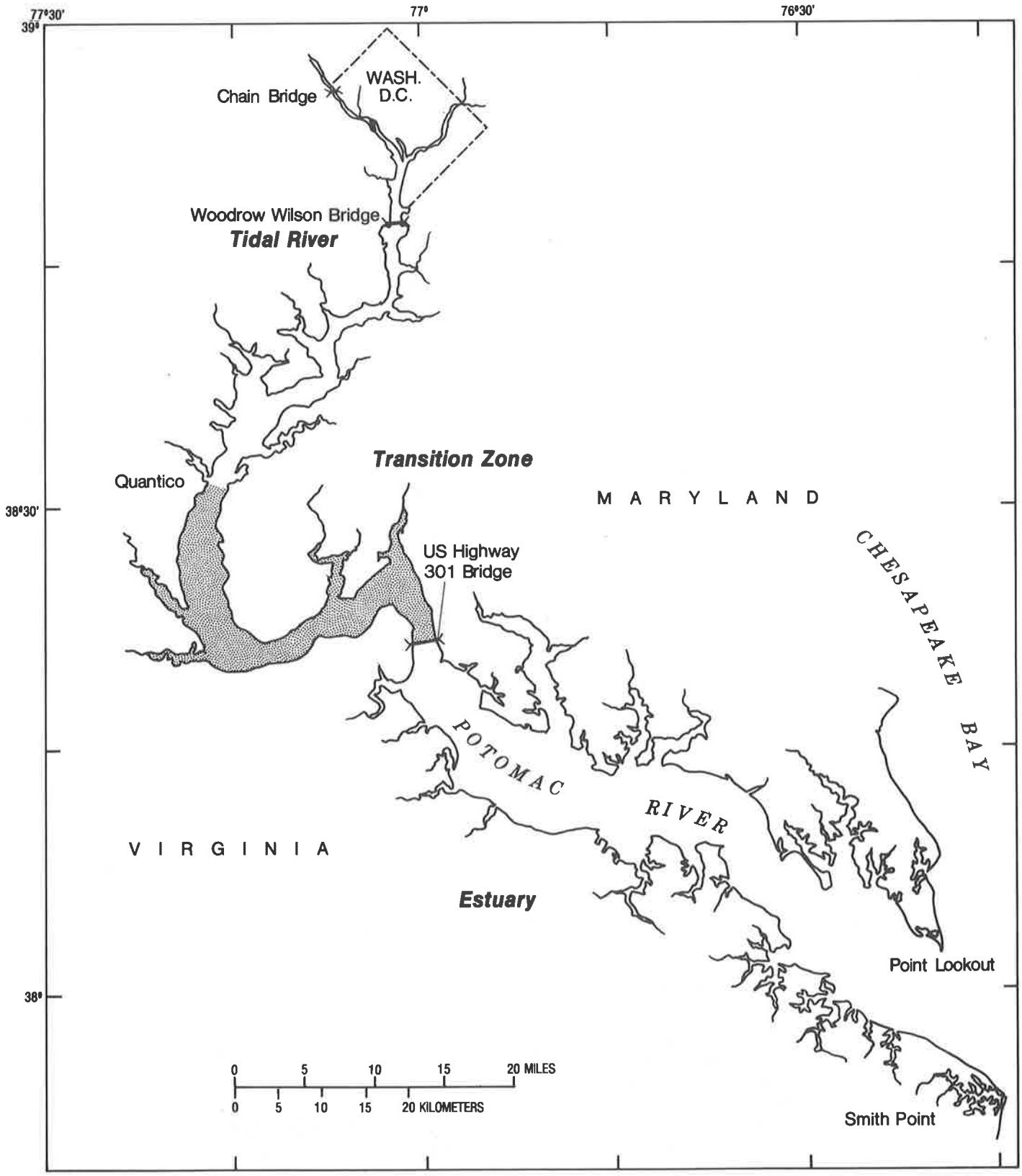

Figure 1. The tidal Potomac River and Estuary.

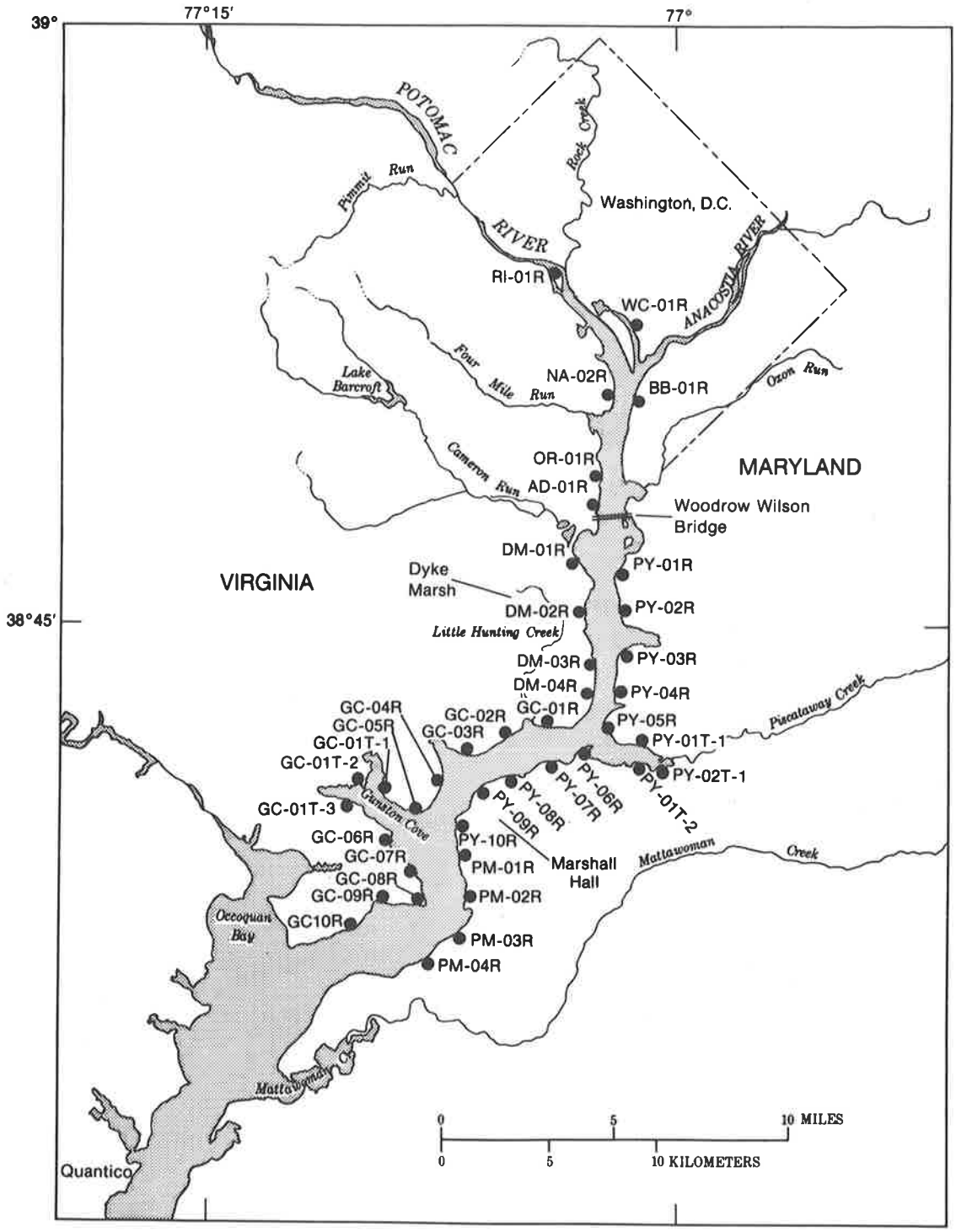

Figure 2. Location of vegetation sampling transects in the tidal Potomac River above Mattawoman Creek. Codes for transects give location, tributary-mile (T) or river-mile (R) for each location. RI is Roosevelt Island, NA is National Airport, OR is Oronoco Bay, AD is Alexandria Dock, DM is Dyke Marsh, GC is Gunston Cove, BB is Bolling Air Force Base, PY is Piscataway Creek, PM is Pomonkey Creek, WC is Washington Channel.

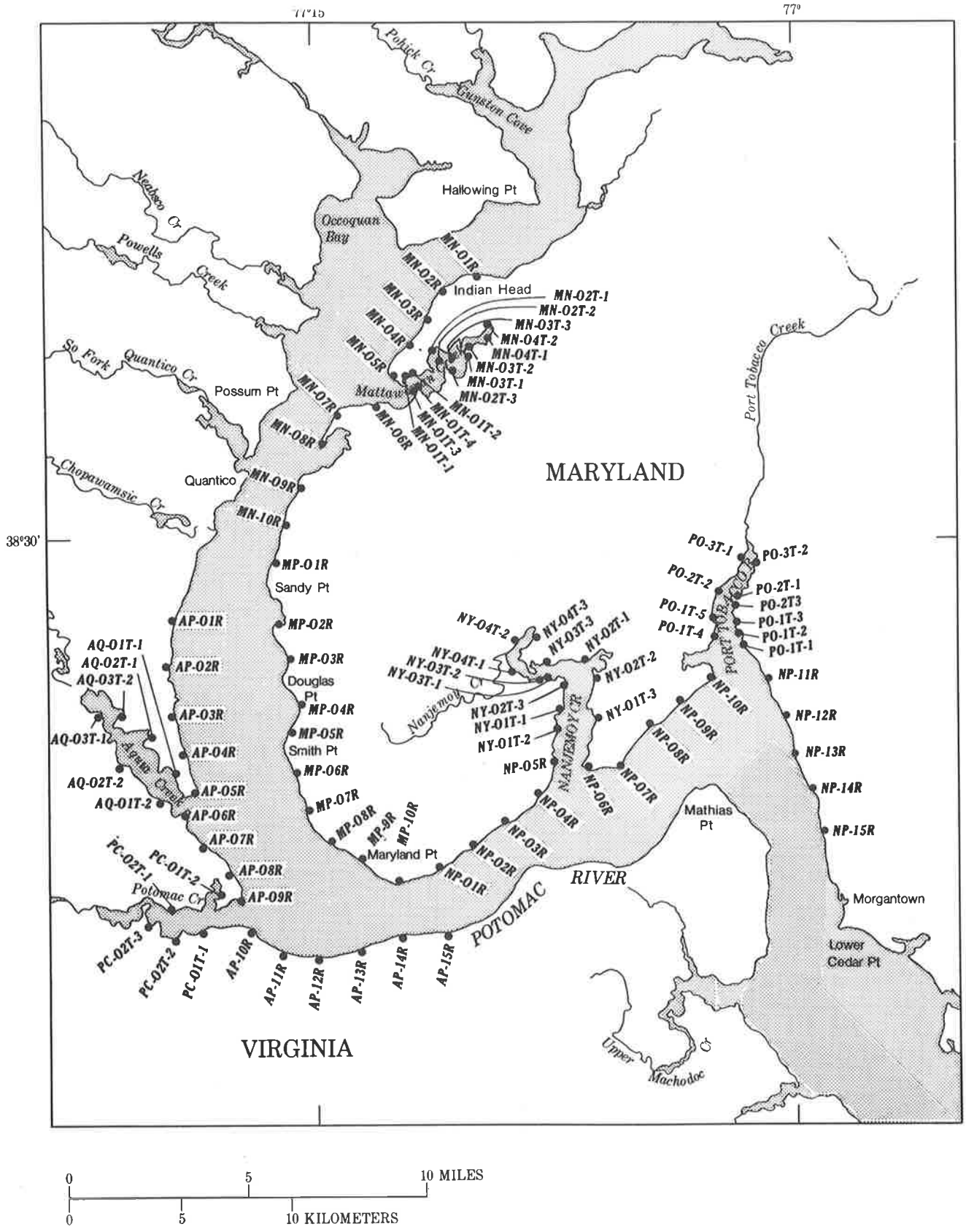

Figure 3. Location of vegetation sampling transects from Mattawoman Creek to Port Tobacco River. Codes for transects give location, tributary-mile (T) or river-mile (R) for each location. MN is Mattawoman Creek, MP is Maryland Point, NP is Nanjemoy Creek-Port Tobacco River, PO is Port Tobacco River, NY is Nanjemoy Creek, AQ is Aquia Creek, PC is Potomac Creek, AP is Aquia Creek-Potomac Creek.

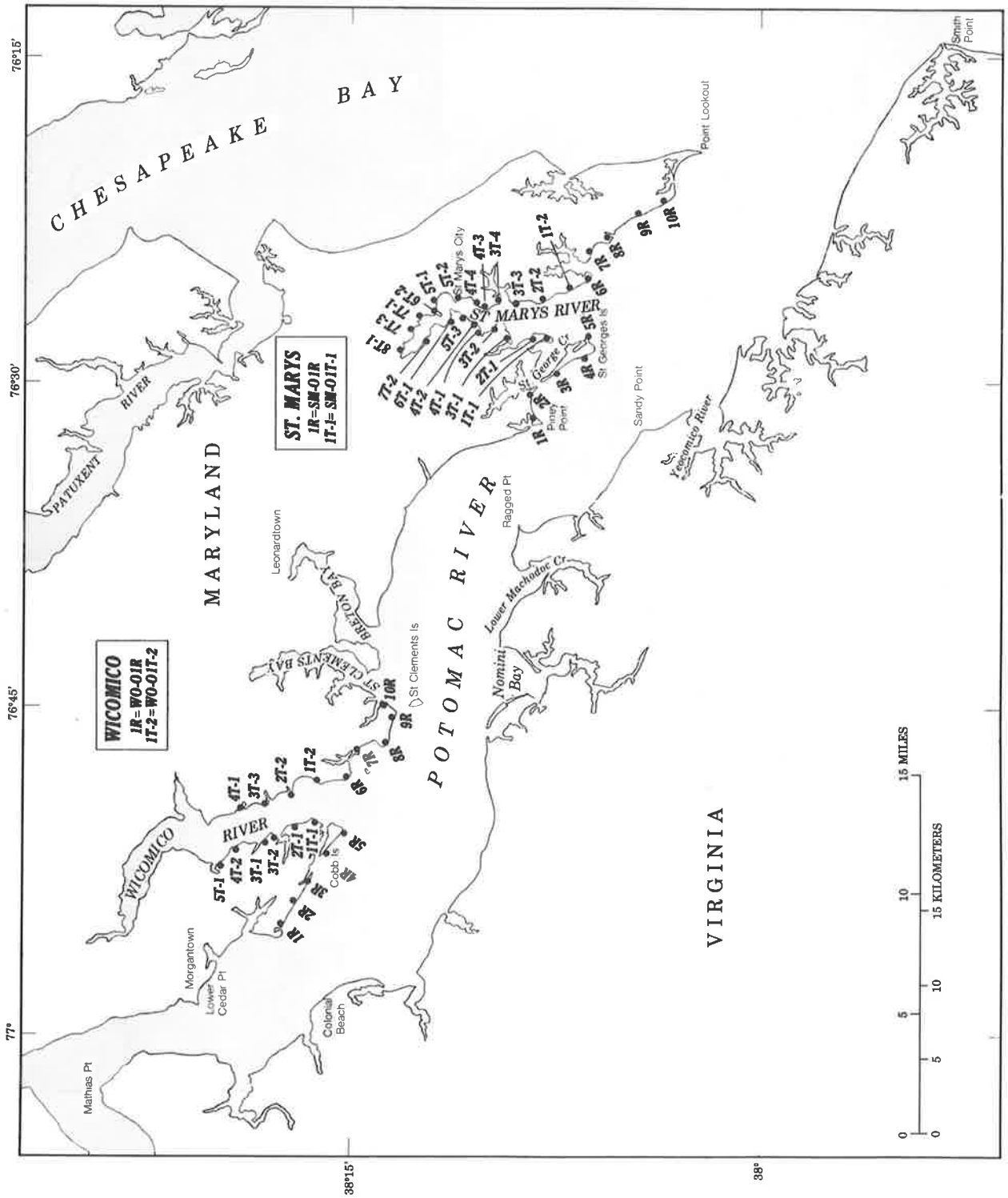

Figure 4. Location of vegetation sampling transects from the Wicomico River to St. Mary's River. Codes give location, tributary-mile (T) and river-mile (R) for each location.

were collected at four stations along the transect corresponding with the depths 0.5 m, 1.0 m, 1.5 m, and 2.0 m.

Codes for the transects in figures 2, 3 and 4 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 1 nm (nautical mile) up the tributary from the mouth, and 2 is the second transect for that tributary mile. In PY-01R, PY is Piscataway Creek, R refers to a transect on the main river, and 01R is the first transect on the edge of the main river.

All stations were sampled three times using modified oyster tongs with blades welded across the teeth to bite into the sediment to collect rooted plants. The area sampled with each grab sample was about 930 cm^2 (square centimeters). All species were identified. Taxonomic nomenclature is according to Hotchkiss (1950, 1967), Radford and others (1964), Wood (1967) and Godfrey and Wooten (1979). A species list for the tidal Potomac River in 1986 is shown in table A-1 (in appendix), and species found at each vegetated transect in spring and fall 1986 are shown in table A-2 (in appendix).

Samples were placed in plastic mesh bags and hung on lines to air dry. They were then dried in ovens at 110°Celsius, and dry weight, in grams per grab sample, and biomass, in grams per square meter of each species, was determined. Relative occurrence of vegetated transects, stations, and grabs per study area are shown in table A-3 (in appendix). Total dry weights and average biomass at each transect (eq. 1-2) are shown in table A-4 (in appendix). The total dry weight and average biomass per station of each species collected (eq. 3-4) are also presented in appendix A.

$$TDW_T = \sum_{1}^{N} \text{dry weights of each grab sample per transect} \qquad (1)$$

$$AB_T = \frac{TDW_T}{N_T} * C \qquad (2)$$

$$TDW_S = \sum_{1}^{3} \text{dry weight of species 'a' per station} \qquad (3)$$

$$AB_S = \frac{TDW_S}{N_S} * C \qquad (4)$$

where

TDW_T = total dry weight per transect
AB_T = average biomass per transect
N_T = total number of grabs per transect
C = conversion to square meters
TDW_S = total dry weight per station of species 'a'
AB_S = average biomass per station of species 'a' and
N_S = total number of grabs per station = 3

In the fall, due to the tremendous increase in biomass, sampling methods were altered to minimize time and labor:

(1) At stations where vegetation formed a dense, tangled mass, visual estimates of the percent of each species in each grab were recorded, but all of the vegetation was not collected and weighed. These fall data are presented as average percent occurrence of each species per station ((Σ(percent of a species per grab per station))/3 grabs per station), appendix A). The standard sampling procedure was used at stations where the vegetation was sparse or absent.

(2) On several transects, subsamples of plant material for the species in each grab sample were dried. If a sample was larger than a predetermined mass, it was divided visually into approximately equal samples. The number of subsamples was recorded; all but one subsample was discarded and the dry weight of the subsample retained was multiplied by the number of subsamples in the grab sample.

Data from biomass samples taken by hand harvesting a 1-square-meter area at depths less than 1 meter, at several locations are presented in table A-33 (in appendix A). Based on the shoreline surveys and the 180 transects sampled in 1986, maps were made of the area[1] coverage of *Hydrilla verticillata* in vegetated areas and percent cover of submersed aquatic vegetation (figs. B-1, B-2, in appendix).

Water transparency measurements were made using a Secchi disk (table C-1, in appendix). Conductivity, pH, dissolved oxygen, and temperature were measured with a Hydrolab 4041[1] (table C-2, in appendix). The tables are divided by season: spring (April-June), summer (July-August), and fall (September-November).

[1]Use of brand or 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 Estuary, 1986. [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*	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 guadalupensis (Sprengel) Morong	Southern naiad
	Najas minor All	
Hydrocharitaceae (frogbit family)	*Vallisneria americana* Michxaux	Wildcelery
	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) MacMillan[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 vegetation found on vegetated transects in the tidal Potomac River and Estuary, 1986

Transect	Species[1]							
	Spring							
OR-01R	HYD	ZANN						
AD-01R	HYD							
DM-01R	CERAT	HET	HYD					
DM-02R	CERAT	HYD	MYRIO					
DM-03R	CERAT	HET	HYD	MYRIO	N.FLEX	VALL		
DM-04R	CERAT	CHARA	HET	HYD	MYRIO	N.FLEX	N.GUAD	N.MIN
	P.PECT	VALL	ZANN					
GC-01R	CERAT	HET	HYD	MYRIO	P.PUS			
GC-02R	CERAT	HYD	MYRIO	N.MIN	VALL			
GC-04R	HYD	MYRIO	VALL					
GC-07R	CERAT	HYD	MYRIO	VALL				
GC-08R	CERAT							
GC-09R	CERAT							
GC-10R	CERAT							
WC-01R	HYD	VALL	ZANN					
PY-01R	CERAT	MYRIO						
PY-02R	CERAT	HET	HYD	MYRIO	VALL			
PY-03R	CERAT	HYD	MYRIO	N.GUAD				
PY-04R	HYD	N.MIN	VALL	ZANN				
PY-05R	HYD	MYRIO	VALL					
PY-06R	CERAT	HET	HYD	MYRIO	VALL			
PY-07R	CERAT	CHARA	HYD	MYRIO	N.FLEX	N.MIN	VALL	ZANN
PY-08R	CERAT	HET	HYD	MYRIO	N.GUAD	N.MIN	VALL	ZANN
PY-09R	CERAT	MYRIO						
PY-10R	CERAT	HYD	MYRIO					
PY-01T-1	CERAT	HYD						
PY-01T-2	CERAT	HYD	MYRIO					
PY-02T-1	CERAT	HYD						
PM-02R	HYD							
MN-09R	VALL	ZANN						
MN-10R	HYD	VALL						
NP-01R	VALL							
NP-02R	P.PECT	VALL						
NP-03R	VALL							
NP-04R	VALL							
NP-05R	P.CRIS	P.PECT	VALL	ZANN				
NP-06R	P.PECT	P.PERF	VALL	ZANN				
NP-07R	VALL	ZANN						
NP-08R	P.PECT	VALL	ZANN					
NP-09R	P.PERF	VALL	ZANN					
NP-10R	P.PERF	VALL	ZANN					

Table A-2.--Species of submersed aquatic vegetation found on vegetated transects in the tidal Potomac River and Estuary, 1986--continued

Transect	Species[1]					
Spring						
NP-11R	P.PERF	VALL				
NP-12R	P.PERF					
NY-01T-3	ZANN					
NY-02T-3	ZANN					
NY-03T-2	CERAT	MYRIO				
NY-03T-3	CERAT	MYRIO	P.CRIS			
NY-04T-3	CERAT	MYRIO	VALL			
PO-01T-3	VALL					
PO-01T-5	CHARA	MYRIO	VALL	ZANN		
PO-02T-1	MYRIO	VALL	ZANN			
PO-02T-2	VALL					
PO-02T-3	P.PECT	P.PERF	VALL			
PO-03T-1	VALL	ZANN				
PO-03T-2	MYRIO	P.CRIS	VALL			
Summer						
WO-01R	RUP					
WO-03T-1	ZANN					
WO-05T-1	ZANN					
Fall						
OR-01R	HYD	MYRIO	P.PECT	VALL		
AD-01R	HYD					
DM-01R	CERAT	HYD				
DM-02R	CERAT	HYD				
DM-03R	CERAT	HET	HYD	MYRIO	VALL	
DM-04R	CERAT	HET	HYD	MYRIO	N.MIN	VALL
GC-01R	CERAT	HET	HYD	MYRIO	N.MIN	VALL
GC-02R	CERAT	HYD	MYRIO	N.MIN	VALL	
GC-03R	CERAT	HYD	MYRIO	N.MIN	VALL	
GC-04R	HYD	MYRIO	VALL			
WC-01R	HYD	VALL				
BB-01R	VALL					

Table A-2.--Species of submersed aquatic vegetation found on vegetated transects in the tidal Potomac River and Estuary, 1986--continued

Transect	Species[1]						
	Fall						
PY-01R	CERAT	HYD	MYRIO	VALL			
PY-02R	CERAT	HET	HYD	MYRIO	N.GUAD	N.MIN	VALL
PY-03R	CERAT	HYD	N.MIN	VALL			
PY-04R	CERAT	HET	HYD	N.MIN	VALL		
PY-05R	HYD	VALL					
PY-06R	CERAT	HET	HYD	MYRIO	N.MIN	VALL	
PY-07R	CERAT	HET	HYD	MYRIO	N.MIN		
PY-08R	CERAT	HET	HYD	MYRIO	N.GUAD	N.MIN	VALL
PY-09R	HYD	MYRIO	N.MIN	VALL			
PY-10R	CERAT	HYD	MYRIO				
PY-01T-1	CERAT	HYD	MYRIO	N.GUAD	N.MIN		
PY-01T-2	CERAT	HET	HYD	MYRIO			
PY-02T-1	CERAT	HYD	MYRIO				
MN-09R	VALL						
MN-10R	HYD	VALL					
MN-04T-2	VALL						
MP-03R	VALL						
MP-04R	VALL						
MP-05R	VALL						
MP-08R	VALL						
MP-09R	VALL						
NP-01R	VALL						
NP-02R	P.PECT	P.PERF	VALL				
NP-03R	VALL						
NP-04R	VALL						
NP-05R	P.PERF	VALL					
NP-06R	CERAT	P.PERF	VALL				
NP-07R	VALL						
NP-08R	VALL						
NP-09R	P.PECT	P.PERF	RUP	VALL			
NP-10R	P.PERF	RUP	VALL				
NY-01T-3	VALL						
NY-03T-2	MYRIO	VALL					
NY-03T-3	CERAT	MYRIO					
NY-04T-1	MYRIO	VALL					
NY-04T-2	CERAT	MYRIO	VALL				
NY-04T-3	CERAT	MYRIO	P.CRIS	VALL			
PO-01T-1	VALL						
PO-01T-5	MYRIO	VALL					
PO-02T-1	MYRIO	RUP	VALL				
PO-02T-2	VALL						

Table A-2.--Species of submersed aquatic vegetation found on vegetated transects in the tidal Potomac River and Estuary, 1986--continued

Transect	Species[1]			
	Fall			
PO-02T-3	MYRIO	P.PERF	RUP	VALL
PO-03T-1	MYRIO	VALL		
PO-03T-2	MYRIO	VALL		

[1] HYD = Hydrilla verticillata, MYRIO = Myriophyllum spicatum, VALL = Vallisneria americana, CERAT = Ceratophyllum demersum, HET = Heteranthera dubia, N.MIN = Najas minor, N.GUAD = Najas guadalupensis, ZANN = Zannichellia palustris, P.CRIS = Potamogeton crispus, P.PECT = Potamogeton pectinatus, P.PERF = Potamogeton perfoliatus, P.PUS = Potamogeton pusillus, RUP = Ruppia maritima, N.FlEX = Nitella flexilis

Table A-3.--Relative occurrence of vegetated transects and vegetated grabs per study area for the tidal Potomac River and Estuary, 1986. [Relative occurrence of vegetated transects/total transects per study area; n.d. is no data available]

Salinity zone/ study areas[1]	Sampling unit	1986		
		Spring	Summer	Fall
Tidal River				
Roosevelt Island to Wilson Bridge	Transects	3/6	n.d.	4/6
	Grabs	25/93	n.d.	31/105
Dyke Marsh	Transects	4/4	n.d.	4/4
	Grabs	130/183	n.d.	146/168
Gunston Cove	Transects	7/13	n.d.	4/13
	Grabs	67/266	n.d.	81/249
Piscataway Creek	Transects	13/13	n.d.	13/13
	Grabs	192/347	n.d.	324/444
Pomonkey Creek	Transects	1/4	n.d.	0/4
	Grabs	2/63	n.d.	0/120
Mattawoman Creek	Transects	2/22	n.d.	3/22
	Grabs	17/360	n.d.	16/327
Transition Zone				
Aquia and Potomac Creek region	Transects	n.d.	n.d.	0/26
	Grabs	n.d.	n.d.	0/390
Maryland Point	Transects	n.d.	n.d.	5/10
	Grabs	n.d.	n.d.	31/171
Nanjemoy Creek-Port Tobacco River region	Transects	24/37	n.d.	23/37
	Grabs	289/765	n.d.	231/612
Estuary				
Wicomico River region below Chaptico Bay[2]	Transects	n.d.	3/20	n.d.
	Grabs	n.d.	5/309	n.d.
St. Marys River region	Transects	n.d.	0/31	n.d.
	Grabs	n.d.	0/432	n.d.

[1]See figs. 2,3 and 4 for exact location of sampling transects in a study area.
[2]The Wicomico River maintains a freshwater to saltwater gradient and, thus, was partitioned into transition zone and estuary. Only the estuary was sampled.

Table A-4.--Total sampled dry weight and average biomass per transect of all species of submersed aquatic vegetation in the tidal Potomac River and Estuary, 1986

[Dry weight in grams; biomass in grams per square meter]

Transect	Vegetated stations	Total dry weight	Average biomass
		Spring 1986	
OR-01R	5	38	17
AD-01R	2	4	3
DM-01R	17	28	5
DM-02R	4	6	4
DM-03R	12	62	15
DM-04R	17	180	32
GC-01R	17	112	21
GC-02R	7	16	6
GC-04R	4	2	1
GC-07R	4	4	2
GC-08R	1	1	0
GC-09R	1	1	0
GC-10R	1	1	0
WC-01R	3	4	4
PY-01R	4	12	6
PY-02R	11	107	28
PY-03R	5	11	5
PY-04R	3	8	6
PY-05R	4	7	4
PY-06R	7	21	8
PY-07R	9	104	34
PY-08R	15	806	173
PY-09R	1	2	1
PY-10R	1	3	2
PY-01T-1	2	2	1
PY-01T-2	4	13	7
PY-02T-1	14	64	16
PM-02R	2	1	1
MN-09R	2	3	2
MN-10R	8	9	3
NP-01R	3	7	4
NP-02R	5	10	5
NP-03R	5	12	6
NP-04R	4	4	2
NP-05R	8	26	9
NP-06R	7	64	23
NP-07R	8	16	6
NP-08R	9	15	5

Table A-4.--Total sampled dry weight and average biomass per transect of all species of submersed aquatic vegetation in the tidal Potomac River and Estuary, 1986--continued

[Dry weight in grams; biomass in grams per square meter; a, indicates dense vegetation not collected and weighed]

Transect	Vegetated stations	Total dry weight	Average biomass
		Spring 1986	
NP-09R	7	18	6
NP-10R	11	56	14
NP-11R	4	5	3
NP-12R	1	1	0
NY-01T-3	1	1	0
NY-02T-3	1	2	1
NY-03T-2	2	1	1
NY-03T-3	10	22	7
NY-04T-3	11	22	6
PO-01T-3	2	2	2
PO-01T-5	5	18	8
PO-02T-1	8	11	3
PO-02T-2	2	3	2
PO-02T-3	2	12	9
PO-03T-1	3	14	10
PO-03T-2	5	34	17
		Summer 1986	
WO-01R	1	1	1
WO-03T-1	1	1	0
WO-05T-1	2	1	1
		Fall[1] 1986	
OR-01R	5	14	6
AD-01R	5	6	3
DM-01R	17	a	a
DM-02R	4	a	a
DM-03R	8	a	a

Table A-4.--Total sampled dry weight and average biomass per transect of all species of submersed aquatic vegetation in the tidal Potomac River and Estuary, 1986--continued

[Dry weight in grams; biomass in grams per square meter; a, indicates dense vegetation not collected and weighed]

Transect	Vegetated stations	Total dry weight	Average biomass
		Fall[1] 1986	
DM-04R	21	a	a
GC-01R	16	a	a
GC-02R	4	a	a
GC-03R	7	9	0
GC-04R	2	135	97
WC-01R	4	28	20
BB-01R	1	2	2
PY-01R	6	120	54
PY-02R	12	a	a
PY-03R	9	a	a
PY-04R	3	a	a
PY-05R	2	25	18
PY-06R	8	a	a
PY-07R	11	a	a
PY-08R	20	a	a
PY-09R	2	4	3
PY-10R	2	31	23
PY-01T-1	33	82	8
PY-01T-2	12	a	a
MN-09R	1	12	8
MN-10R	5	55	28
MN-04T-2	2	50	36
MP-03R	1	1	0
MP-04R	9	154	46
MP-05R	1	9	6
MP-06R	1	0	0
MP-08R	1	1	0
MP-09R	1	19	14
NP-01R	2	6	4
NP-02R	4	19	11
NP-03R	3	15	9
NP-04R	4	5	3
NP-05R	5	4	2
NP-06R	6	66	24
NP-07R	7	10	3
NP-08R	6	5	2

Table A-4.--Total sampled dry weight and average biomass per transect of all species of submersed aquatic vegetation in the tidal Potomac River and Estuary, 1986--continued

[Dry weight in grams; biomass in grams per square meter]

Transect	Vegetated stations	Total dry weight	Average biomass
		Fall[1] 1986	
NP-09R	6	118	53
NP-10R	5	53	19
NY-01T-3	1	1	0
NY-03T-2	2	15	11
NY-03T-3	3	76	54
NY-04T-1	2	2	1
NY-04T-2	2	33	23
NY-04T-3	14	323	68
PO-01T-1	4	49	35
PO-01T-3	2	55	39
PO-01T-5	4	97	58
PO-02T-1	4	40	24
PO-02T-2	2	70	50
PO-02T-3	2	80	58
PO-03T-1	4	6	4
PO-03T-2	3	78	56

[1] In fall, transects where visual estimates were made are not included.

Table A-5.--Total dry weight and average biomass of *Vallisneria americana* in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
DM-03R	180	1	4	NP-01R	45	1	4
DM-04R	15	13	48	NP-02R	15	1	4
DM-04R	30	1	2	NP-02R	30	2	5
DM-04R	45	6	20	NP-02R	45	1	4
DM-04R	105	1	4	NP-02R	60	2	8
DM-04R	150	2	6	NP-02R	75	3	9
DM-04R	165	1	2	NP-03R	5	4	14
DM-04R	195	1	4	NP-03R	15	2	5
GC-02R	5	1	4	NP-03R	30	4	14
GC-04R	3	1	2	NP-03R	45	2	5
GC-07R	15	1	2	NP-03R	60	1	4
WC-01R	5	1	2	NP-04R	15	1	4
WC-01R	12	3	9	NP-04R	30	1	2
PY-02R	150	3	10	NP-04R	45	1	4
PY-04R	10	5	17	NP-04R	60	2	5
PY-04R	38	1	4	NP-05R	5	1	2
PY-05R	5	1	2	NP-05R	15	1	4
PY-05R	30	1	4	NP-05R	30	2	5
PY-05R	45	3	9	NP-05R	60	3	10
PY-06R	15	4	14	NP-05R	75	3	11
PY-06R	30	1	2	NP-05R	90	1	4
PY-06R	45	1	4	NP-06R	45	2	5
PY-06R	60	3	10	NP-06R	60	1	2
PY-06R	90	1	2	NP-06R	75	2	5
PY-07R	75	14	51	NP-06R	90	2	5
PY-07R	105	1	2	NP-07R	5	2	5
PY-07R	120	4	13	NP-07R	15	2	5
PY-08R	30	3	12	NP-07R	30	2	5
PY-08R	165	1	2	NP-07R	45	2	5
PY-08R	195	2	6	NP-07R	60	1	2
PY-08R	210	2	5	NP-07R	75	2	5
MN-09R	5	1	2	NP-07R	90	4	13
MN-09R	15	2	6	NP-07R	105	1	2
MN-10R	5	1	4	NP-08R	30	1	4
MN-10R	30	1	4	NP-08R	45	1	2
MN-10R	45	1	2	NP-08R	60	2	5
MN-10R	60	2	6	NP-08R	75	2	5
MN-10R	75	2	6	NP-08R	90	2	5
MN-10R	105	1	4	NP-08R	105	1	4
NP-01R	15	5	17	NP-08R	120	1	4
NP-01R	30	1	4	NP-09R	30	1	2

Table A-5.--Total dry weight and average biomass of *Vallisneria americana* in the tidal Potomac River and Estuary, spring 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
NP-09R	45	1	4
NP-09R	60	1	4
NP-09R	75	2	5
NP-09R	90	1	2
NP-10R	45	2	5
NP-10R	60	1	4
NP-10R	75	1	2
NP-10R	90	2	5
NP-11R	5	1	4
NP-11R	15	2	5
NP-11R	30	1	4
NP-11R	45	1	4
NY-04T-3	5	1	4
NY-04T-3	15	8	28
NY-04T-3	105	1	2
NY-04T-3	120	1	2
NY-04T-3	135	1	4
PO-01T-3	7	2	5
PO-01T-3	15	1	2
PO-01T-5	5	2	5
PO-01T-5	15	9	33
PO-02T-1	5	2	5
PO-02T-1	15	4	15
PO-02T-2	5	2	5
PO-02T-2	15	2	5
PO-02T-3	5	1	4
PO-02T-3	15	1	2
PO-03T-1	15	1	4
PO-03T-1	30	1	2
PO-03T-2	5	2	5

Table A-6.--Total dry weight, average biomass, and average percent occurrence of *Vallisneria americana* in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
OR-01R	75	10	35	a
DM-03R	90	b	b	0.2
DM-04R	15	b	b	5.2
DM-04R	45	b	b	1.8
DM-04R	60	b	b	5.0
DM-04R	135	b	b	21.7
DM-04R	150	b	b	6.7
DM-04R	165	b	b	33.5
DM-04R	180	b	b	13.5
DM-04R	210	b	b	0.2
DM-04R	255	b	b	20.0
DM-04R	285	9	30	a
GC-01R	5	b	b	0.5
GC-01R	135	b	b	0.2
GC-01R	150	b	b	0.2
GC-01R	165	b	b	0.2
GC-01R	195	b	b	0.2
GC-02R	5	b	b	61.3
GC-02R	15	b	b	1.8
GC-02R	30	b	b	0.2
GC-03R	5	b	b	0.2
GC-03R	30	b	b	0.3
GC-03R	45	b	b	13.3
GC-03R	60	b	b	0.2
GC-03R	75	b	b	0.3
GC-04R	10	64	228	a
GC-04R	30	2	8	a
WC-01R	7	27	98	a
WC-01R	15	36	129	a
BB-01R	7	2	8	a
PY-01R	60	1	4	a
PY-02R	45	b	b	1.3
PY-03R	5	b	b	1.8
PY-03R	105	1	2	a
PY-04R	5	4	14	a
PY-04R	15	b	b	35.0
PY-04R	30	b	b	28.2
PY-05R	5	11	39	a
PY-05R	15	13	46	a
PY-06R	5	b	b	48.3

Table A-6.--Total dry weight, average biomass, and average percent occurrence of *Vallisneria americana* in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-06R	15	b	b	3.3
PY-06R	30	b	b	4.3
PY-06R	45	b	b	0.3
PY-06R	105	3	10	a
PY-08R	210	b	b	2.0
PY-08R	240	b	b	0.3
PY-09R	5	2	7	a
PY-09R	15	1	2	a
MN-09R	5	12	41	a
MN-10R	5	7	25	a
MN-10R	15	26	93	a
MN-10R	30	5	19	a
MN-10R	45	5	18	a
MN-10R	60	11	38	a
MN-04T-2	1	50	179	a
MN-04T-2	4	1	2	a
MP-03R	15	1	2	a
MP-04R	5	1	4	a
MP-04R	30	51	184	a
MP-04R	45	28	101	a
MP-04R	60	22	80	a
MP-04R	75	5	17	a
MP-04R	90	34	121	a
MP-04R	105	11	39	a
MP-04R	120	1	4	a
MP-04R	135	1	2	a
MP-05R	15	9	32	a
MP-08R	5	1	2	a
MP-09R	15	19	69	a
NP-01R	15	4	15	a
NP-01R	30	2	5	a
NP-02R	15	5	18	a
NP-02R	30	6	22	a
NP-02R	45	4	13	a
NP-03R	5	12	42	a
NP-03R	15	2	5	a
NP-03R	45	2	5	a
NP-04R	15	2	5	a
NP-04R	30	2	5	a
NP-04R	45	2	5	a

Table A-6.--Total dry weight, average biomass, and average percent occurrence of *Vallisneria americana* in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
NP-04R	60	1	2	a
NP-05R	15	1	4	a
NP-05R	30	1	4	a
NP-05R	60	1	2	a
NP-05R	75	1	2	a
NP-06R	30	2	5	a
NP-06R	45	6	22	a
NP-06R	60	11	39	a
NP-06R	75	16	58	a
NP-06R	90	9	33	a
NP-06R	105	10	34	a
NP-07R	15	2	5	a
NP-07R	30	2	5	a
NP-07R	45	1	4	a
NP-07R	60	4	13	a
NP-07R	75	1	4	a
NP-07R	90	1	2	a
NP-07R	105	1	2	a
NP-08R	15	1	2	a
NP-08R	30	1	4	a
NP-08R	45	1	4	a
NP-08R	60	1	2	a
NP-08R	75	1	4	a
NP-08R	105	1	2	a
NP-09R	5	1	2	a
NP-09R	15	1	2	a
NP-09R	45	1	4	a
NP-09R	75	1	4	a
NP-10R	45	1	4	a
NP-10R	60	1	2	a
NP-10R	90	1	2	a
NY-01T-3	5	1	2	a
NY-03T-2	15	1	2	a
NY-04T-1	5	1	4	a
NY-04T-1	15	1	2	a
NY-04T-2	5	19	70	a
NY-04T-3	5	10	35	a
NY-04T-3	15	4	16	a
NY-04T-3	30	49	177	a
NY-04T-3	45	27	95	a

Table A-6.--Total dry weight, average biomass, and average percent occurrence of *Vallisneria americana* in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
NY-04T-3	60	6	22	a
NY-04T-3	75	7	25	a
NY-04T-3	105	16	57	a
NY-04T-3	120	7	24	a
NY-04T-3	135	11	41	a
NY-04T-3	165	16	57	a
PO-01T-1	5	38	136	a
PO-01T-1	15	11	41	a
PO-01T-5	5	9	30	a
PO-01T-5	15	20	71	a
PO-01T-5	30	1	2	a
PO-02T-1	5	1	2	a
PO-02T-1	15	17	61	a
PO-02T-1	45	1	2	a
PO-02T-2	5	27	96	a
PO-02T-2	15	43	155	a
PO-02T-3	5	2	5	a
PO-02T-3	15	42	150	a
PO-03T-1	5	1	2	a
PO-03T-1	30	1	2	a
PO-03T-1	45	1	2	a
PO-03T-2	5	21	76	a
PO-03T-2	15	16	57	a
PO-03T-2	30	2	5	a

Table A-7 --Total dry weight and average biomass of *Myriophyllum spicatum* in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
DM-02R	15	1	2	PY-02R	60	34	121
DM-03R	75	1	2	PY-02R	75	11	40
DM-03R	150	1	2	PY-02R	90	1	4
DM-04R	5	2	5	PY-02R	105	6	20
DM-04R	15	1	4	PY-02R	120	11	38
DM-04R	30	2	5	PY-02R	135	27	97
DM-04R	45	1	4	PY-02R	150	1	2
DM-04R	60	9	30	PY-02R	165	1	2
DM-04R	75	1	4	PY-03R	5	1	2
DM-04R	90	16	56	PY-03R	30	4	14
DM-04R	105	1	2	PY-05R	5	1	4
DM-04R	120	1	4	PY-06R	15	1	2
DM-04R	135	2	5	PY-06R	45	1	2
DM-04R	165	1	2	PY-06R	60	1	2
DM-04R	180	1	1	PY-07R	30	1	4
GC-01R	30	1	2	PY-07R	45	1	2
GC-01R	45	2	5	PY-07R	60	1	4
GC-01R	60	8	27	PY-07R	75	2	6
GC-01R	75	2	8	PY-07R	105	1	2
GC-01R	90	1	2	PY-08R	5	2	8
GC-01R	105	7	23	PY-08R	30	1	2
GC-01R	120	2	5	PY-08R	45	63	223
GC-01R	135	8	29	PY-08R	60	39	139
GC-01R	150	17	59	PY-08R	75	46	163
GC-01R	165	2	7	PY-08R	90	95	336
GC-01R	180	16	58	PY-08R	105	69	250
GC-01R	195	17	59	PY-08R	120	62	218
GC-01R	210	5	17	PY-08R	135	6	20
GC-02R	5	1	2	PY-08R	150	49	173
GC-02R	15	2	5	PY-08R	165	68	239
GC-02R	30	1	2	PY-08R	180	51	179
GC-02R	90	1	2	PY-08R	195	2	6
GC-04R	10	1	2	PY-08R	210	10	35
GC-07R	45	1	2	PY-09R	30	1	2
GC-07R	60	1	2	PY-10R	60	1	4
PY-01R	15	1	2	PY-01T-2	15	5	17
PY-01R	30	9	33	PY-01T-2	30	1	2
PY-01R	45	1	2	NY-03T-2	15	1	2
PY-01R	60	1	4	NY-03T-3	15	1	2
PY-02R	15	2	8	NY-03T-3	75	1	2
PY-02R	30	31	112	NY-03T-3	90	1	2
PY-02R	45	21	74	NY-03T-3	135	1	2

Table A-7.--Total dry weight and average biomass of Myriophyllum spicatum in the tidal Potomac River and Estuary, spring 1986--continued
[Dry weight in grams; biomass in grams per square meter
distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
NY-04T-3	5	1	2
NY-04T-3	45	1	2
NY-04T-3	60	1	2
PO-01T-5	15	1	2
PO-01T-5	45	2	5
PO-01T-5	60	2	5
PO-01T-5	75	2	5
PO-02T-1	5	1	2
PO-02T-1	30	1	2
PO-02T-1	45	1	4
PO-02T-1	60	1	2
PO-02T-1	75	1	2
PO-02T-1	90	1	2
PO-02T-1	120	1	2
PO-03T-2	5	2	5
PO-03T-2	15	28	100
PO-03T-2	30	2	5
PO-03T-2	45	1	2
PO-03T-2	60	1	2

Table A-8.--Total dry weight, average biomass, and average percent occurrence of *Myriophyllum spicatum* in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
OR-01R	30	1	2	a
DM-03R	15	b	b	0.2
DM-03R	45	b	b	0.2
DM-04R	60	b	b	3.3
DM-04R	75	b	b	3.3
DM-04R	90	b	b	0.2
DM-04R	105	b	b	0.2
DM-04R	120	b	b	0.2
DM-04R	195	b	b	15.0
DM-04R	210	b	b	0.2
DM-04R	225	b	b	0.2
DM-04R	285	1	2	a
GC-01R	5	b	b	0.3
GC-01R	15	b	b	1.8
GC-01R	30	b	b	5.0
GC-01R	45	b	b	0.3
GC-01R	60	b	b	3.5
GC-01R	75	b	b	3.5
GC-01R	90	b	b	1.8
GC-01R	105	b	b	0.2
GC-01R	120	b	b	0.3
GC-01R	135	b	b	16.8
GC-01R	150	b	b	26.7
GC-01R	165	b	b	21.8
GC-01R	180	b	b	35.0
GC-01R	195	b	b	29.8
GC-01R	210	b	b	0.2
GC-02R	5	b	b	0.3
GC-02R	15	b	b	3.5
GC-02R	30	b	b	8.5
GC-03R	5	b	b	0.8
GC-03R	15	b	b	30.0
GC-03R	30	b	b	25.3
GC-03R	45	b	b	81.7
GC-03R	60	b	b	67.7
GC-03R	75	b	b	81.3
GC-03R	90	b	b	33.3
GC-04R	10	68	243	a
PY-01R	15	1	4	a
PY-01R	45	1	4	a

Table A-8.--Total dry weight, average biomass, and average percent occurrence of Myriophyllum spicatum in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-01R	60	86	308	a
PY-02R	5	b	b	0.2
PY-02R	15	b	b	3.5
PY-02R	30	b	b	0.2
PY-02R	45	b	b	0.2
PY-02R	60	b	b	0.5
PY-02R	75	b	b	3.7
PY-02R	90	b	b	3.5
PY-02R	105	b	b	3.5
PY-02R	120	b	b	0.3
PY-02R	135	b	b	20.0
PY-02R	150	b	b	33.3
PY-06R	45	b	b	0.2
PY-07R	30	b	b	0.2
PY-07R	45	b	b	0.2
PY-07R	60	b	b	1.5
PY-07R	75	b	b	3.3
PY-07R	105	b	b	1.3
PY-07R	120	b	b	2.0
PY-07R	135	b	b	5.2
PY-07R	150	b	b	0.2
PY-08R	90	b	b	0.2
PY-08R	210	b	b	0.3
PY-08R	225	b	b	0.3
PY-08R	240	b	b	0.2
PY-08R	255	b	b	0.2
PY-08R	285	1	2	a
PY-09R	5	1	4	a
PY-10R	15	24	86	a
PY-10R	30	3	10	a
PY-01T-1	5	18	64	a
PY-01T-1	180	1	2	a
PY-01T-1	195	1	2	a
PY-01T-1	210	1	2	a
PY-01T-1	355	1	4	a
PY-01T-1	385	1	2	a
PY-01T-1	450	1	2	a
PY-01T-1	495	1	2	a
PY-01T-2	5	1	2	a
PY-01T-2	15	15	5	a

Table A-8.--Total dry weight, average biomass, and average percent occurrence of *Myriophyllum spicatum* in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs.

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-01T-2	165	1	2	a
PY-02T-1	45	b	b	5.3
PY-02T-1	60	b	b	0.3
NY-03T-2	5	7	26	a
NY-03T-2	15	7	26	a
NY-03T-3	5	2	5	a
NY-03T-3	15	7	23	a
NY-04T-1	5	1	2	a
NY-04T-2	5	13	45	a
NY-04T-3	5	31	109	a
NY-04T-3	15	25	90	a
NY-04T-3	30	11	41	a
NY-04T-3	45	29	104	a
NY-04T-3	60	9	31	a
NY-04T-3	75	14	48	a
NY-04T-3	90	1	2	a
NY-04T-3	105	10	37	a
NY-04T-3	120	1	4	a
NY-04T-3	135	3	10	a
NY-04T-3	150	17	61	a
NY-04T-3	165	12	42	a
NY-04T-3	195	1	4	a
NY-04T-3	210	1	2	a
PO-01T-5	15	2	5	a
PO-01T-5	30	65	233	a
PO-01T-5	45	2	5	a
PO-02T-1	5	2	5	a
PO-02T-1	15	1	2	a
PO-02T-1	30	8	29	a
PO-02T-1	45	7	25	a
PO-02T-3	5	1	4	a
PO-03T-1	5	2	5	a
PO-03T-1	15	1	4	a
PO-03T-1	30	1	2	a
PO-03T-1	45	2	5	a
PO-03T-2	5	2	5	a
PO-03T-2	15	38	135	a
PO-03T-2	30	1	2	a

Table A-9.--Total dry weight and average biomass of Zannichellia palustris in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
OR-01R	5	7	23	NP-09R	105	1	4
OR-01R	15	9	31	NP-10R	15	1	2
OR-01R	30	12	44	NP-10R	30	1	4
OR-01R	45	9	31	NP-10R	45	1	4
DM-04R	15	4	13	NP-10R	60	1	4
DM-04R	30	5	18	NP-10R	75	1	4
DM-04R	45	2	8	NP-10R	90	1	2
DM-04R	60	1	2	NP-10R	105	1	2
DM-04R	75	1	2	NP-10R	135	1	2
PY-04R	10	1	2	NP-10R	150	1	2
PY-07R	15	1	2	NP-10R	165	1	2
PY-07R	30	1	2	NY-01T-3	5	1	2
PY-07R	75	1	4	NY-02T-3	5	2	5
PY-08R	45	2	5	PO-01T-5	5	1	4
PY-08R	60	1	4	PO-01T-5	15	1	2
PY-08R	75	1	2	PO-02T-1	5	1	4
PY-08R	105	1	2	PO-03T-1	5	11	39
PY-08R	165	1	2	PO-03T-1	15	1	4
MN-09R	5	1	4	PO-03T-1	30	1	2
NP-05R	15	1	4				
NP-06R	15	5	19				
NP-06R	30	1	4				
NP-06R	45	1	4				
NP-06R	60	1	4				
NP-06R	90	1	2				
NP-06R	105	1	2				
NP-07R	5	1	4				
NP-07R	15	2	5				
NP-07R	30	1	4				
NP-07R	60	1	2				
NP-08R	5	2	5				
NP-08R	15	2	5				
NP-08R	30	1	4				
NP-08R	45	1	2				
NP-08R	60	1	4				
NP-08R	75	1	2				
NP-09R	15	7	24				
NP-09R	30	2	5				
NP-09R	45	2	5				
NP-09R	60	1	4				
NP-09R	75	1	2				
NP-09R	90	1	2				

Table A-10--Total dry weight and average biomass of Zannichellia palustris in the Potomac River Estuary, summer 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
WO-03T-1	60	1	2	a
WO-05T-1	15	1	2	a
WO-05T-1	30	1	2	a

Table A-11--Total dry weight, average biomass, and average percent occurrence of *Zannichellia palustris* in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance From Shore	Total dry Weight	Average Biomass	Percent occurrence
PY-01R	60	1	2	a
PY-05R	5	1	2	a

Table A-12--Total dry weight and average biomass of *Hydrilla verticillata* in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter
distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
OR-01R	15	1	2	DM-04R	90	5	17
OR-01R	45	1	2	DM-04R	105	2	7
OR-01R	75	1	4	DM-04R	120	6	20
AD-01R	15	2	5	DM-04R	135	1	2
AD-01R	45	3	10	DM-04R	150	2	9
DM-01R	5	2	5	DM-04R	165	2	6
DM-01R	15	1	4	DM-04R	180	1	3
DM-01R	30	1	5	DM-04R	195	1	2
DM-01R	45	2	6	DM-04R	205	2	5
DM-01R	60	1	3	DM-04R	220	1	4
DM-01R	75	1	4	DM-04R	250	1	2
DM-01R	90	2	6	GC-01R	5	1	4
DM-01R	105	1	4	GC-01R	15	1	4
DM-01R	120	1	4	GC-01R	45	1	2
DM-01R	135	2	5	GC-01R	60	1	4
DM-01R	150	2	5	GC-01R	75	2	5
DM-01R	165	2	8	GC-01R	90	1	4
DM-01R	190	2	5	GC-01R	105	1	2
DM-01R	205	2	5	GC-01R	120	1	4
DM-01R	220	2	5	GC-01R	135	1	4
DM-01R	235	1	2	GC-01R	150	2	5
DM-01R	265	1	2	GC-01R	165	1	3
DM-02R	5	2	5	GC-01R	180	1	4
DM-02R	15	2	5	GC-01R	210	1	2
DM-02R	30	1	3	GC-02R	15	3	11
DM-02R	45	1	2	GC-02R	30	2	6
DM-03R	5	3	12	GC-02R	45	1	4
DM-03R	30	7	24	GC-02R	75	1	2
DM-03R	45	4	12	GC-04R	15	1	2
DM-03R	60	5	19	GC-04R	20	1	2
DM-03R	75	8	28	GC-04R	25	1	2
DM-03R	90	6	21	GC-07R	15	1	2
DM-03R	105	3	10	GC-07R	45	1	2
DM-03R	135	1	4	GC-07R	90	1	2
DM-03R	150	13	45	WC-01R	15	1	4
DM-03R	150	1	2	PY-02R	15	1	5
DM-04R	5	1	4	PY-02R	30	1	4
DM-04R	15	3	11	PY-02R	45	2	6
DM-04R	30	5	18	PY-02R	60	2	6
DM-04R	45	2	7	PY-02R	75	2	5
DM-04R	60	2	7	PY-02R	90	5	17
DM-04R	75	11	38	PY-02R	105	3	12

Table A-12.--Total dry weight and average biomass of Hydrilla verticillata in the tidal Potomac River and Estuary, spring 1986--continued
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
PY-02R	120	2	7	PY-02T-1	5	1	3
PY-02R	135	2	5	PY-02T-1	15	4	14
PY-02R	150	1	4	PY-02T-1	30	5	18
PY-02R	165	1	2	PY-02T-1	45	4	13
PY-03R	5	1	2	PY-02T-1	60	8	30
PY-03R	15	2	5	PY-02T-1	75	7	25
PY-03R	30	1	4	PY-02T-1	90	3	11
PY-03R	45	2	6	PY-02T-1	105	4	13
PY-03R	60	1	2	PY-02T-1	120	3	11
PY-04R	2	1	2	PY-02T-1	135	1	3
PY-04R	38	1	2	PY-02T-1	150	1	4
PY-06R	5	1	2	PY-02T-1	165	1	2
PY-06R	15	2	5	PY-02T-1	180	1	4
PY-06R	45	6	22	PY-02T-1	195	4	14
PY-06R	60	2	5	PM-02R	30	1	2
PY-06R	75	1	4	PM-02R	45	1	2
PY-07R	5	19	69	MN-10R	90	1	4
PY-07R	15	7	25				
PY-07R	30	6	21				
PY-07R	45	2	8				
PY-07R	60	14	50				
PY-07R	75	1	4				
PY-07R	105	1	2				
PY-08R	5	1	4				
PY-08R	15	3	10				
PY-08R	30	10	35				
PY-08R	45	28	99				
PY-08R	60	6	21				
PY-08R	75	5	18				
PY-08R	90	7	25				
PY-08R	105	9	30				
PY-08R	120	4	14				
PY-08R	135	5	19				
PY-08R	150	5	17				
PY-08R	165	6	20				
PY-08R	180	6	23				
PY-08R	195	10	35				
PY-08R	210	1	2				
PY-10R	60	1	2				
PY-01T-1	45	1	2				
PY-01T-2	5	1	4				
PY-01T-2	15	6	23				

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
OR-01R	15	1	2	a
OR-01R	30	2	5	a
OR-01R	60	1	2	a
OR-01R	75	1	2	a
OR-01R	90	1	2	a
AD-01R	11	1	4	a
AD-01R	40	2	5	a
AD-01R	50	2	5	a
AD-01R	55	1	4	a
AD-01R	70	1	2	a
DM-01R	5	b	b	66.7
DM-01R	15	b	b	100.0
DM-01R	30	b	b	100.0
DM-01R	45	b	b	100.0
DM-01R	60	b	b	100.0
DM-01R	75	b	b	96.7
DM-01R	90	b	b	100.0
DM-01R	105	b	b	95.0
DM-01R	120	b	b	100.0
DM-01R	135	b	b	90.0
DM-01R	150	b	b	66.5
DM-01R	165	b	b	0.3
DM-01R	180	b	b	0.2
DM-01R	195	b	b	96.7
DM-01R	210	b	b	90.0
DM-01R	225	b	b	98.0
DM-01R	240	b	b	99.7
DM-02R	5	b	b	98.3
DM-02R	15	b	b	100.0
DM-02R	30	b	b	96.3
DM-02R	45	b	b	99.7
DM-03R	5	b	b	100.0
DM-03R	15	b	b	93.0
DM-03R	30	b	b	100.0
DM-03R	45	b	b	99.3
DM-03R	60	b	b	100.0
DM-03R	75	b	b	100.0
DM-03R	90	b	b	99.7
DM-03R	105	b	b	94.7

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
DM-04R	5	b	b	96.3
DM-04R	15	b	b	94.7
DM-04R	30	b	b	99.7
DM-04R	45	b	b	96.3
DM-04R	60	b	b	91.7
DM-04R	75	b	b	94.7
DM-04R	90	b	b	99.7
DM-04R	105	b	b	59.7
DM-04R	120	b	b	99.3
DM-04R	135	b	b	43.5
DM-04R	150	b	b	89.7
DM-04R	165	b	b	59.7
DM-04R	180	b	b	79.7
DM-04R	195	b	b	76.7
DM-04R	210	b	b	97.3
DM-04R	225	b	b	76.3
DM-04R	240	b	b	91.7
DM-04R	255	b	b	75.0
DM-04R	270	b	b	99.7
DM-04R	285	3	10	a
DM-04R	300	4	13	a
GC-01R	5	b	b	82.0
GC-01R	15	b	b	74.7
GC-01R	30	b	b	81.3
GC-01R	45	b	b	95.7
GC-01R	60	b	b	76.3
GC-01R	75	b	b	94.0
GC-01R	90	b	b	91.3
GC-01R	105	b	b	86.3
GC-01R	120	b	b	97.7
GC-01R	135	b	b	78.0
GC-01R	150	b	b	69.7
GC-01R	165	b	b	56.0
GC-01R	180	b	b	61.3
GC-01R	195	b	b	69.3
GC-01R	210	b	b	66.5
GC-01R	225	1	2	a
GC-02R	5	b	b	38.0
GC-02R	15	b	b	94.0

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
GC-02R	30	b	b	91.0
GC-02R	45	2	5	a
GC-03R	5	b	b	98.0
GC-03R	15	b	b	66.7
GC-03R	30	b	b	72.3
GC-03R	45	b	b	5.2
GC-03R	60	b	b	31.8
GC-03R	75	b	b	18.5
GC-04R	10	1	4	a
GC-04R	30	1	2	a
WC-01R	7	7	23	a
WC-01R	15	2	5	a
WC-01R	20	4	13	a
WC-01R	30	1	4	a
PY-01R	5	1	2	a
PY-01R	15	8	29	a
PY-01R	45	7	27	a
PY-01R	60	24	85	a
PY-01R	75	11	39	a
PY-02R	5	b	b	99.7
PY-02R	15	b	b	91.3
PY-02R	30	b	b	96.3
PY-02R	45	b	b	91.7
PY-02R	60	b	b	76.3
PY-02R	75	b	b	92.7
PY-02R	90	b	b	94.3
PY-02R	105	b	b	94.7
PY-02R	120	b	b	96.0
PY-02R	135	b	b	66.7
PY-02R	150	b	b	64.5
PY-02R	165	1	2	a
PY-03R	5	b	b	54.8
PY-03R	15	b	b	100.0
PY-03R	30	b	b	100.0
PY-03R	45	b	b	100.0
PY-03R	60	b	b	99.3
PY-03R	75	b	b	100.0
PY-03R	90	b	b	99.0
PY-03R	105	44	157	a

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-03R	120	1	4	a
PY-04R	5	78	280	a
PY-04R	15	b	b	36.3
PY-04R	30	b	b	71.3
PY-05R	5	1	4	a
PY-06R	5	b	b	50.0
PY-06R	15	b	b	91.7
PY-06R	30	b	b	90.0
PY-06R	45	b	b	97.7
PY-06R	60	b	b	100.0
PY-06R	75	b	b	93.0
PY-06R	90	b	b	61.7
PY-06R	105	84	301	a
PY-07R	5	b	b	65.0
PY-07R	15	b	b	98.3
PY-07R	30	b	b	80.0
PY-07R	45	b	b	99.0
PY-07R	60	b	b	74.7
PY-07R	75	b	b	78.0
PY-07R	90	b	b	97.7
PY-07R	105	b	b	97.7
PY-07R	120	b	b	93.3
PY-07R	135	b	b	76.7
PY-07R	150	b	b	66.3
PY-08R	5	b	b	100.0
PY-08R	15	b	b	100.0
PY-08R	30	b	b	63.3
PY-08R	45	b	b	50.0
PY-08R	60	b	b	43.3
PY-08R	75	b	b	16.7
PY-08R	90	b	b	28.0
PY-08R	105	b	b	55.0
PY-08R	120	b	b	46.7
PY-08R	135	b	b	50.0
PY-08R	150	b	b	56.7
PY-08R	165	b	b	36.7
PY-08R	180	b	b	63.3
PY-08R	195	b	b	33.3
PY-08R	210	b	b	90.7

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-08R	225	b	b	94.7
PY-08R	240	b	b	97.0
PY-08R	255	b	b	63.5
PY-08R	270	b	b	30.0
PY-09R	5	1	2	a
PY-10R	15	1	4	a
PY-10R	30	2	9	a
PY-01T-1	5	2	5	a
PY-01T-1	15	2	5	a
PY-01T-1	45	1	4	a
PY-01T-1	60	1	4	a
PY-01T-1	75	1	2	a
PY-01T-1	90	1	2	a
PY-01T-1	105	2	5	a
PY-01T-1	120	1	4	a
PY-01T-1	135	1	4	a
PY-01T-1	165	3	10	a
PY-01T-1	180	3	10	a
PY-01T-1	195	1	4	a
PY-01T-1	210	3	12	a
PY-01T-1	235	1	4	a
PY-01T-1	250	1	4	a
PY-01T-1	265	1	4	a
PY-01T-1	295	8	28	a
PY-01T-1	310	1	2	a
PY-01T-1	325	1	4	a
PY-01T-1	340	1	4	a
PY-01T-1	355	2	7	a
PY-01T-1	370	2	6	a
PY-01T-1	385	3	12	a
PY-01T-1	400	1	4	a
PY-01T-1	415	1	4	a
PY-01T-1	435	1	4	a
PY-01T-1	450	2	8	a
PY-01T-1	465	1	2	a
PY-01T-1	480	1	4	a
PY-01T-1	495	3	9	a
PY-01T-2	5	2	5	a
PY-01T-2	15	269	399	a

Table A-13.--Total dry weight, average biomass, and average percent occurrence of Hydrilla verticillata in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-01T-2	30	1	2	a
PY-01T-2	45	2	5	a
PY-01T-2	60	2	5	a
PY-01T-2	75	2	5	a
PY-01T-2	90	2	5	a
PY-01T-2	105	2	5	a
PY-01T-2	120	1	4	a
PY-01T-2	135	2	6	a
PY-01T-2	150	2	7	a
PY-01T-2	165	6	20	a
PY-02T-1	5	b	b	158.0
PY-02T-1	15	b	b	65.0
PY-02T-1	45	b	b	89.7
PY-02T-1	60	b	b	43.2
PY-02T-1	75	b	b	99.5
MN-10R	30	1	2	a
MN-10R	45	1	2	a

Table A-14.--Total dry weight and average biomass of Potamogeton pectinatus in the tidal Potomac River and Estuary , spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-04R	30	1	4
DM-04R	45	1	2
NP-02R	15	1	2
NP-02R	45	2	5
NP-05R	15	1	4
NP-06R	30	9	34
NP-06R	60	1	4
NP-08R	30	1	2
PO-02T-3	5	1	2

Table A-15.--Total dry weight, average biomass, and average percent occurrence of Potamogeton pectinatus in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
OR-01R	75	1	2	a
NP-02R	5	1	2	a
NP-09R	15	1	2	a
NP-09R	30	1	2	a

Table A-16.--Total dry weight and average biomass of Potamogeton pusillus in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry Weight	Average biomass
GC-01R	5	1	2

Table A-17.--Total dry weight and average biomass of Potamogeton perfoliatus in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
NP-06R	30	6	20
NP-06R	45	21	74
NP-06R	60	12	43
NP-06R	90	1	2
NP-09R	45	1	4
NP-10R	30	1	2
NP-10R	60	32	113
NP-10R	90	10	37
NP-10R	120	2	5
NP-11R	30	1	2
NP-12R	5	1	2
PO-02T-3	5	10	37

Table A-18.--Total dry weight, average biomass, and average percent occurrence of Potamogeton perfoliatus in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
NP-02R	5	3	9	a
NP-02R	15	1	4	a
NP-05R	5	1	5	a
NP-06R	30	3	10	a
NP-06R	45	5	18	a
NP-06R	60	4	15	a
NP-09R	60	1	2	a
NP-10R	45	37	134	a
NP-10R	60	8	29	a
NP-10R	75	2	5	a
NP-10R	90	2	5	a
NP-10R	105	2	5	a
PO-02T-3	5	35	127	a

Table A-19.--Total dry weight and average biomass of Potamogeton crispus in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
NP-05R	90	8	27
NP-05R	105	4	14
NP-05R	120	3	10
NY-03T-3	45	1	4
NY-03T-3	105	1	4
PO-03T-2	15	1	2

Table A-20.--Total dry weight, average biomass, and average percent occurrence of Potamogeton crispus in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
NY-04T-3	5	2	8	a

Table A-21.--Total dry weight and average biomass of Najas minor in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-04R	75	1	4
DM-04R	90	1	2
DM-04R	105	2	5
DM-04R	120	1	2
GC-02R	15	1	4
PY-04R	2	1	2
PY-07R	15	2	5
PY-07R	30	3	11
PY-07R	45	2	7
PY-07R	60	2	5
PY-07R	75	1	4
PY-07R	90	2	5
PY-08R	60	1	2
PY-08R	165	1	4
PY-08R	195	2	5
PY-08R	210	1	2

Table A-22-Total dry weight, average biomass, and average percent occurrence of Najas minor in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
DM-04R	15	b	b	0.2
GC-01R	15	b	b	0.2
GC-01R	45	b	b	0.2
GC-01R	90	b	b	0.2
GC-02R	15	b	b	0.2
GC-03R	5	b	b	0.3
PY-02R	105	b	b	0.2
PY-02R	120	b	b	0.2
PY-02R	135	b	b	13.0
PY-03R	5	b	b	43.2
PY-04R	5	2	5	a
PY-04R	15	b	b	28.3
PY-04R	30	b	b	0.2
PY-06R	5	b	b	0.2
PY-06R	30	b	b	3.3
PY-06R	75	b	b	0.2
PY-07R	5	b	b	11.8
PY-07R	30	b	b	3.3
PY-07R	45	b	b	0.5
PY-07R	60	b	b	23.5
PY-07R	75	b	b	15.2
PY-07R	90	b	b	0.3
PY-07R	120	b	b	3.0
PY-07R	135	b	b	17.7
PY-07R	150	b	b	8.2
PY-08R	195	b	b	0.2
PY-08R	210	b	b	2.0
PY-08R	225	b	b	1.3
PY-08R	240	b	b	1.5
PY-08R	255	b	b	36.0
PY-08R	270	b	b	0.2
PY-09R	5	1	2	a
PY-01T-1	385	1	2	a

Table A-23.--Total dry weight and average biomass of Najas guadalupensis in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-03R	90	1	4
DM-03R	105	1	2
DM-04R	60	0.1	0.4
DM-04R	90	1	2
DM-04R	120	2	5
DM-04R	150	3	9
DM-04R	165	1	4
DM-04R	180	1	2
PY-03R	15	1	2
PY-08R	60	1	2
PY-08R	120	1	2
PY-08R	150	1	4
PY-08R	165	1	2
PY-08R	180	1	4

Table A-24.--Total dry weight, average biomass, and average percent occurrence of Najas guadalupensis in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-02R	150	b	b	1.7
PY-08R	270	b	b	0.2
PY-01T-1	370	1	2	a

Table A-25.--Total dry weight and average biomass of Nitella flexilis in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-03R	30	1	2
DM-03R	150	1	2
DM-04R	30	1	2
DM-04R	45	1	2
DM-04R	60	1	4
DM-04R	150	1	2
PY-07R	45	1	2

Table A-26.--Total dry weight and average biomass of Chara sp. in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-03R	150	1	2
DM-04R	30	1	2
DM-04R	45	1	4
DM-04R	60	1	4
PY-07R	15	4	15
PY-07R	30	3	10
PY-07R	45	5	19
PO-01T-5	5	1	2

Table A-27.--Total dry weight and average biomass of Heteranthera dubia in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
DM-01R	120	1	2
DM-01R	190	1	2
DM-01R	235	1	2
DM-03R	45	1	2
DM-03R	90	1	2
DM-03R	180	1	2
DM-04R	30	1	4
DM-04R	45	1	2
DM-04R	60	4	16
DM-04R	75	2	5
DM-04R	90	1	2
DM-04R	105	1	2
DM-04R	120	1	4
DM-04R	135	1	2
DM-04R	150	2	5
DM-04R	165	1	2
GC-01R	5	1	2
GC-01R	135	1	2
PY-02R	90	1	2
PY-02R	105	1	2
PY-02R	120	1	2
PY-02R	165	1	2
PY-06R	5	1	2
PY-06R	60	1	2
PY-08R	75	1	4
PY-08R	90	1	2
PY-08R	120	1	2
PY-08R	165	1	2
PY-08R	180	1	2
PY-08R	195	2	5

Table A-28.--Total dry weight, average biomass, and average percent occurrence of Heteranthera dubia in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
DM-03R	15	b	b	6.7
DM-04R	255	b	b	1.7
DM-04R	270	b	b	0.2
DM-04R	300	1	2	a
GC-01R	5	b	b	1.8
GC-01R	30	b	b	0.2
GC-01R	75	b	b	0.2
GC-01R	90	b	b	0.2
GC-01R	105	b	b	5.0
PY-02R	45	b	b	1.3
PY-02R	60	b	b	19.8
PY-02R	135	b	b	0.2
PY-04R	5	7	27	a
PY-06R	90	b	b	33.3
PY-07R	30	b	b	1.3
PY-07R	105	b	b	0.2
PY-07R	135	b	b	0.2
PY-07R	150	b	b	25.0
PY-08R	240	b	b	0.2
PY-01T-2	15	1	0	a

Table A-29.--Total dry weight and average biomass of *Ceratophyllum demersum* in the tidal Potomac River and Estuary, spring 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
DM-01R	30	1	2	GC-01R	135	1	2
DM-01R	60	1	2	GC-01R	150	1	2
DM-01R	105	1	2	GC-01R	165	1	4
DM-01R	150	1	4	GC-01R	210	1	2
DM-01R	165	1	2	GC-01R	225	1	2
DM-01R	190	1	2	GC-01R	240	1	2
DM-01R	220	1	2	GC-02R	15	3	11
DM-01R	235	1	2	GC-02R	30	1	5
DM-02R	15	1	2	GC-02R	45	1	2
DM-02R	30	1	3	GC-02R	60	1	2
DM-03R	30	1	2	GC-02R	90	1	2
DM-03R	45	1	4	GC-07R	15	1	2
DM-03R	60	1	2	GC-07R	60	1	2
DM-03R	75	2	5	GC-08R	15	1	2
DM-03R	90	2	5	GC-09R	60	1	2
DM-03R	105	1	2	GC-10R	30	1	3
DM-03R	150	1	4	PY-01R	45	1	2
DM-03R	165	1	2	PY-02R	15	1	4
DM-04R	5	1	2	PY-02R	30	1	3
DM-04R	15	2	8	PY-02R	45	1	4
DM-04R	30	5	18	PY-02R	60	1	4
DM-04R	45	4	15	PY-02R	75	1	4
DM-04R	60	7	26	PY-02R	90	1	4
DM-04R	75	2	5	PY-02R	105	6	20
DM-04R	90	3	12	PY-02R	120	2	8
DM-04R	105	6	22	PY-02R	135	2	7
DM-04R	120	2	7	PY-02R	150	2	8
DM-04R	135	1	2	PY-02R	165	1	2
DM-04R	150	2	5	PY-03R	5	1	4
DM-04R	165	2	5	PY-05R	45	2	6
DM-04R	180	2	6	PY-06R	5	1	2
DM-04R	195	2	5	PY-06R	15	1	4
DM-04R	205	1	2	PY-06R	45	2	8
DM-04R	220	1	4	PY-06R	60	1	4
DM-04R	250	1	2	PY-07R	5	1	4
GC-01R	5	1	3	PY-07R	15	1	4
GC-01R	15	1	2	PY-07R	30	1	4
GC-01R	45	4	14	PY-07R	60	1	4
GC-01R	60	1	4	PY-07R	75	1	4
GC-01R	75	2	6	PY-07R	120	1	2
GC-01R	90	2	5	PY-08R	5	2	6
GC-01R	105	1	4	PY-08R	30	2	8
GC-01R	120	1	2	PY-08R	45	12	44

Table A-29.--Total dry weight and average biomass of Ceratophyllum demersum in the tidal Potomac River and Estuary, spring 1986--continued
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass	Transect	Distance from shore	Total dry weight	Average biomass
PY-08R	60	17	60	NY-04T-3	90	1	2
PY-08R	75	10	35	NY-04T-3	105	1	2
PY-08R	90	17	61	NY-04T-3	120	1	2
PY-08R	105	3	11	NY-04T-3	135	1	4
PY-08R	120	5	17	NY-04T-3	150	1	2
PY-08R	150	13	48				
PY-08R	165	23	82				
PY-08R	180	9	31				
PY-08R	195	4	14				
PY-08R	210	1	4				
PY-09R	30	1	4				
PY-10R	60	2	6				
PY-01T-1	15	1	2				
PY-01T-1	45	1	2				
PY-01T-2	60	1	2				
PY-02T-1	15	2	5				
PY-02T-1	30	2	6				
PY-02T-1	45	1	4				
PY-02T-1	60	2	5				
PY-02T-1	75	2	8				
PY-02T-1	90	2	8				
PY-02T-1	105	2	5				
PY-02T-1	120	1	4				
PY-02T-1	135	1	4				
PY-02T-1	180	1	2				
PY-02T-1	195	3	11				
NY-03T-2	45	1	2				
NY-03T-3	5	4	16				
NY-03T-3	15	1	2				
NY-03T-3	30	2	5				
NY-03T-3	45	3	10				
NY-03T-3	60	2	5				
NY-03T-3	75	2	5				
NY-03T-3	90	2	5				
NY-03T-3	105	2	5				
NY-03T-3	120	2	5				
NY-03T-3	135	1	4				
NY-04T-3	5	1	2				
NY-04T-3	15	1	4				
NY-04T-3	30	2	5				
NY-04T-3	45	2	5				
NY-04T-3	60	1	2				
NY-04T-3	75	2	5				

Table A-30.--Total dry weight, average biomass, and average percent occurrence of Ceratophyllum demersum in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
DM-01R	75	b	b	3.3
DM-01R	105	b	b	5.0
DM-01R	135	b	b	10.0
DM-01R	150	b	b	0.2
DM-01R	165	b	b	0.2
DM-01R	180	b	b	0.2
DM-01R	195	b	b	3.3
DM-01R	210	b	b	10.0
DM-01R	225	b	b	1.8
DM-01R	240	b	b	0.2
DM-02R	5	b	b	1.7
DM-02R	30	b	b	3.5
DM-02R	45	b	b	0.2
DM-03R	45	b	b	0.2
DM-03R	90	b	b	0.2
DM-03R	105	b	b	5.2
DM-04R	5	b	b	3.5
DM-04R	30	b	b	0.2
DM-04R	45	b	b	1.7
DM-04R	75	b	b	1.8
DM-04R	90	b	b	0.2
DM-04R	105	b	b	40.0
DM-04R	120	b	b	0.3
DM-04R	135	b	b	34.7
DM-04R	150	b	b	3.5
DM-04R	165	b	b	6.7
DM-04R	180	b	b	6.7
DM-04R	195	b	b	8.3
DM-04R	210	b	b	1.8
DM-04R	225	b	b	23.3
DM-04R	240	b	b	8.3
DM-04R	255	b	b	3.3
DM-04R	285	1	2	a
GC-01R	5	b	b	15.0
GC-01R	15	b	b	23.3
GC-01R	30	b	b	13.3
GC-01R	45	b	b	3.7
GC-01R	60	b	b	20.0
GC-01R	75	b	b	2.0

Table A-30.--Total dry weight, average biomass, and average percent occurrence of Ceratophyllum demersum in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
GC-01R	90	b	b	6.7
GC-01R	105	b	b	8.5
GC-01R	120	b	b	1.7
GC-01R	135	b	b	5.0
GC-01R	150	b	b	3.3
GC-01R	165	b	b	21.7
GC-01R	180	b	b	3.5
GC-01R	195	b	b	0.3
GC-02R	15	b	b	0.2
GC-02R	30	b	b	0.2
GC-03R	5	b	b	0.2
GC-03R	15	b	b	3.3
GC-03R	30	b	b	1.7
GC-03R	45	b	b	0.2
GC-03R	60	b	b	0.2
PY-01R	15	1	4	a
PY-01R	45	1	2	a
PY-01R	60	1	4	a
PY-02R	15	b	b	5.0
PY-02R	30	b	b	3.5
PY-02R	45	b	b	5.3
PY-02R	60	b	b	3.2
PY-02R	75	b	b	3.3
PY-02R	90	b	b	1.8
PY-02R	105	b	b	1.7
PY-02R	120	b	b	3.3
PY-02R	150	b	b	0.5
PY-03R	5	b	b	1.7
PY-03R	60	b	b	0.3
PY-03R	90	b	b	0.5
PY-03R	105	1	2	a
PY-04R	5	1	4	a
PY-04R	15	b	b	0.2
PY-06R	15	b	b	6.7
PY-06R	30	b	b	2.0
PY-06R	45	b	b	1.7
PY-06R	75	b	b	6.7
PY-06R	90	b	b	5.0
PY-07R	5	b	b	23.0

Table A-30.--Total dry weight, average biomass, and average percent occurrence of Ceratophyllum demersum in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-07R	15	b	b	1.7
PY-07R	30	b	b	15.0
PY-07R	45	b	b	0.2
PY-07R	75	b	b	3.5
PY-07R	90	b	b	1.7
PY-07R	105	b	b	0.5
PY-07R	120	b	b	1.5
PY-07R	135	b	b	0.2
PY-07R	150	b	b	0.2
PY-08R	30	b	b	36.7
PY-08R	45	b	b	50.0
PY-08R	60	b	b	56.7
PY-08R	75	b	b	83.3
PY-08R	90	b	b	71.7
PY-08R	105	b	b	45.0
PY-08R	120	b	b	53.3
PY-08R	135	b	b	50.0
PY-08R	150	b	b	43.3
PY-08R	165	b	b	63.3
PY-08R	180	b	b	36.7
PY-08R	195	b	b	66.3
PY-08R	210	b	b	5.0
PY-08R	225	b	b	3.3
PY-08R	240	b	b	0.3
PY-08R	255	b	b	0.2
PY-08R	270	b	b	36.3
PY-08R	285	1	2	a
PY-10R	30	2	6	a
PY-01T-1	5	5	19	a
PY-01T-1	45	3	12	a
PY-01T-1	210	1	2	a
PY-01T-1	235	1	2	a
PY-01T-1	510	1	2	a
PY-01T-2	15	16	21	a
PY-01T-2	150	1	2	a
PY-01T-2	165	1	2	a
PY-02T-1	15	b	b	38.5
PY-02T-1	45	b	b	10.0
PY-02T-1	60	b	b	56.5

Table A-30.--Total dry weight, average biomass, and average percent occurrence of Ceratophyllum demersum in the tidal Potomac River and Estuary, fall 1986--continued

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
PY-02T-1	75	b	b	0.5
NP-06R	30	1	2	a
NY-03T-3	5	1	4	a
NY-03T-3	15	66	235	a
NY-03T-3	30	1	4	a
NY-04T-2	30	1	2	a
NY-04T-3	5	1	4	a
NY-04T-3	15	1	4	a
NY-04T-3	30	1	4	a
NY-04T-3	45	1	4	a
NY-04T-3	60	1	2	a
NY-04T-3	105	1	2	a

Table A-31.--Total dry weight and average biomass of Ruppia maritima in the Potomac River Estuary, summer 1986
[Dry weight in grams; biomass in grams per square meter; distance in meters]

Transect	Distance from shore	Total dry weight	Average biomass
WO-01R	60	1	4

Table A-32.-- Total dry weight, average biomass, and average percent occurrence of Ruppia maritima in the tidal Potomac River and Estuary, fall 1986

[Dry weight in grams; biomass in grams per square meter; distance in meters; a, sparse vegetation, collected and weighed; b, dense vegetation, not collected and weighed; percent occurrence estimated as average of three grabs]

Transect	Distance from shore	Total dry weight	Average biomass	Percent occurrence
NP-09R	5	16	56	a
NP-09R	15	55	198	a
NP-09R	30	40	144	a
NP-09R	45	2	5	a
NP-09R	60	1	2	a
NP-09R	75	1	2	a
NP-10R	45	1	2	a
PO-02T-1	5	1	4	a
PO-02T-1	30	1	2	a
PO-02T-1	45	3	12	a
PO-02T-3	5	1	2	a

Table A-33.--Biomass of vegetation in sample quadrats, fall, 1986
[Biomass in grams per square meter, water depth is less than 1 m]

Nearest transect	Total biomass
DM-4R	141.1
DM-4R	145.0
DM-4R	129.5
DM-4R	178.5
DM-4R	243.7
GC-01R	294.0
GC-01R	351.7
GC-01R	419.4
GC-01R	302.0
GC-01R	415.9
GC-02R	122.5
GC-02R	251.9
GC-02R	388.1
GC-02R	305.9
GC-02R	243.4
PY-1T-1	246.6
PY-1T-1	320.3
PY-1T-1	286.9
PY-1T-1	234.4
PY-1T-1	346.6
PY-01R	751.3
PY-01R	357.4
PY-01R	142.7
PY-01R	365.3
PY-02R	665.0
PY-02R	772.4
PY-02R	323.6
PY-02R	317.8
PY-02R	378.3
PY-02R	115.2
PY-02R	118.6
PY-02R	161.0
PY-02R	271.7
PY-02R	271.4
PY-03R	244.1
PY-03R	397.0
PY-03R	272.1
PY-03R	315.3
PY-03R	230.7

Appendix B. Distribution maps, 1986.

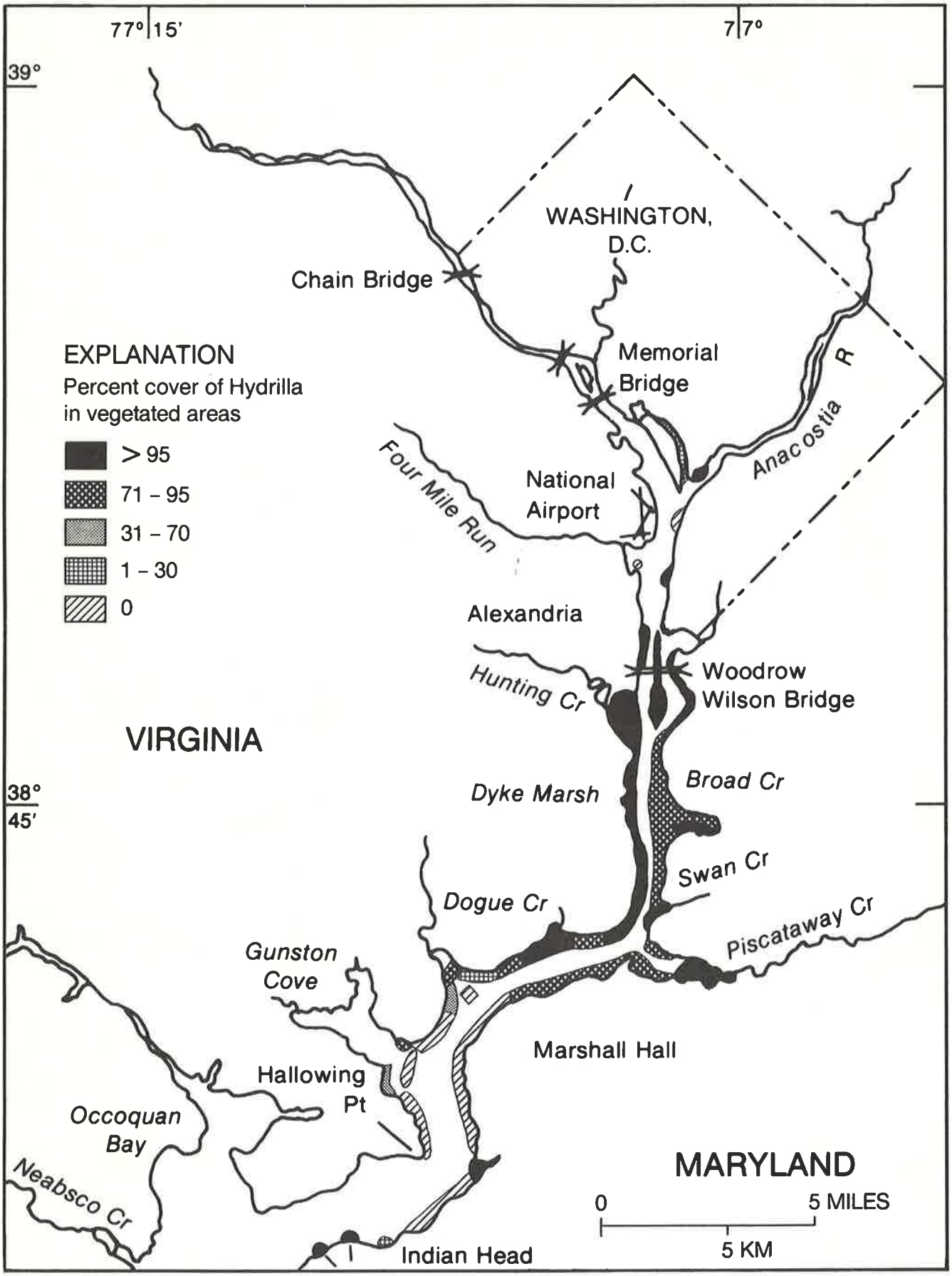

Figure B-1. Percent cover of Hydrilla verticillata in vegetated areas of the tidal Potomac River, fall 1986.

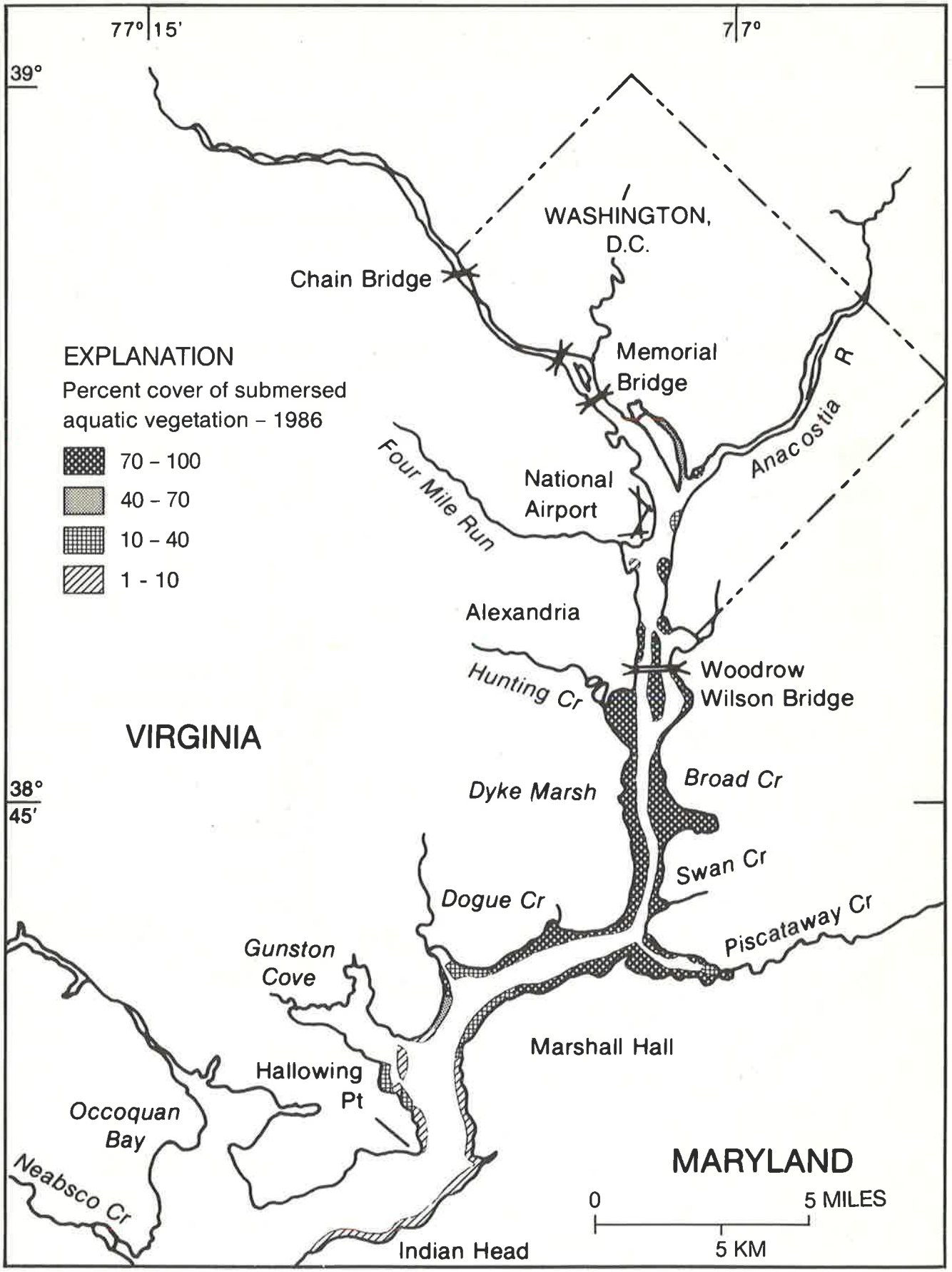

Figure B-2. Percent cover of submersed aquatic plants in the tidal Potomac River, fall 1986.

Appendix C. Water-quality data.

Table C-1.--Secchi depths in the tidal Potomac River and Estuary, 1986

Nearest transect	Date	Secchi depth (centimeters)	Nearest transect	Date	Secchi depth (centimeters)
RI-01R	5-27	79	PC-02T-2	10- 9	50
RI-01R	8-15	95	WC-01R	5-27	82
NA-02R	5-27	66	WC-01R	8-15	126
OR-01R	5-27	55	BB-01R	5-27	70
OR-01R	9- 9	76	PY-01R	9-29	82
AD-01R	5-27	57	PY-02R	9- 5	178
AD-01R	6-29	80	PY-02R	9-29	108
DM-03R	5-21	90	PY-03R	6- 9	50
DM-03R	5-23	75	PY-03R	9- 9	181
DM-03R	9- 4	183	PY-03R	9-29	160
DM-03R	10- 1	106	PY-04R	9-29	93
DM-04R	5-21	48	PY-05R	9- 9	90
DM-04R	10- 1	147	PY-05R	9-30	83
GC-01R	5-23	78	PY-06R	9-30	100
GC-01R	9- 4	68	PY-06R	11- 4	79
GC-01R	10- 1	83	PY-06R	11- 4	84
GC-02R	6- 4	72	PY-06R	11- 6	66
GC-02R	9- 3	86	PY-06R	11- 6	81
GC-02R	10- 1	89	PY-06R	11- 6	53
GC-03R	6- 4	68	PY-07R	9-30	94
GC-03R	9-18	60	PY-08R	9-30	94
GC-04R	6- 4	69	PY-09R	6- 4	65
GC-05R	9- 3	59	PY-09R	9- 8	60
GC-06R	5-28	45	PY-09R	11- 4	66
GC-07R	5-28	52	PY-09R	11- 4	79
GC-07R	9- 3	53	PY-09R	11- 4	76
GC-08R	5-28	50	PY-09R	11- 6	91
GC-09R	5-21	32	PY-09R	11- 6	94
GC-09R	5-23	47	PY-10R	6- 5	59
GC-09R	5-28	65	PY-10R	9- 8	46
GC-10R	5-28	45	PY-10R	11- 4	61
GC-10R	6- 9	51	PY-10R	11- 4	53
GC-10R	9- 3	48	PY-10R	11- 4	76
GC-10R	10-30	37	PY-10R	11- 6	89
GC-10R	10-30	46	PY-10R	11- 6	79
GC-01T-2	7- 3	25	PY-10R	11- 6	64
AP-08R	10- 8	105	PY-01T-2	9-30	117
AP-10R	10- 9	92	PM-01R	6- 5	65
AP-12R	10- 9	85	PM-01R	8-14	59
AP-14R	10- 9	55	PM-02R	5-30	78
AQ-01T-1	10- 3	52	PM-02R	8-14	56
AQ-02T-1	10- 8	46	PM-02R	10- 3	60
AQ-03T-2	10- 8	27	PM-03R	6- 5	86
PC-02T-1	10- 9	40			

Table C-1.--Secchi depths in the tidal Potomac River and Estuary, 1986--continued

Nearest transect	Date	Secchi depth (centimeters)	Nearest transect	Date	Secchi depth (centimeters)
PM-03R	8-14	65	MN-03T-3	5-20	41
PM-04R	6- 5	92	MN-03T-3	6- 3	41
PM-04R	8-14	64	MN-03T-3	8-14	50
MN-01R	6- 4	90	MN-04T-1	6- 3	48
MN-01R	8-14	66	MN-04T-2	6- 3	39
MN-02R	6- 4	83	MP-02R	6-24	39
MN-02R	8-14	44	NP-01R	6-10	56
MN-03R	6- 4	76	NP-02R	10- 9	40
MN-03R	8-14	58	NP-03R	6-10	44
MN-04R	6- 4	56	NP-03R	10- 8	33
MN-04R	8-14	56	NP-04R	6-10	55
MN-05R	6- 5	61	NP-05R	6-10	59
MN-05R	8-14	48	NP-06R	6-12	44
MN-06R	6- 3	56	NP-09R	6-12	56
MN-06R	8-14	50	NP-11R	6-12	66
MN-07R	6- 3	43	NP-12R	6-12	65
MN-07R	8-14	63	NP-13R	6-12	65
MN-08R	6- 3	43	NP-14R	6-12	49
MN-08R	8-14	48	NP-15R	6-12	54
MN-09R	6- 3	45	NY-01T-1	6-10	38
MN-09R	8-14	69	NY-01T-1	10- 7	51
MN-10R	6- 3	34	NY-02T-1	6-10	48
MN-10R	8-14	76	NY-02T-1	10- 7	43
MN-01T-1	6-24	46	NY-03T-2	10- 7	46
MN-01T-1	8-14	50	NY-04T-2	6-10	19
MN-01T-2	8-14	50	NY-04T-2	10- 7	40
MN-01T-3	6- 3	55	PO-01T-1	6-12	57
MN-01T-3	6- 6	58	PO-02T-1	6-12	28
MN-01T-3	8-14	44	PO-02T-2	6-12	44
MN-01T-4	6- 3	50	PO-02T-3	6-12	37
MN-01T-4	8-14	47	PO-03T-1	6-12	30
MN-01T-4	10- 3	28	PO-03T-2	6-12	34
MN-02T-1	6- 3	51	WO-01T-1	7- 8	70
MN-02T-1	6- 9	26	WO-03T-2	7- 8	51
MN-02T-1	8-14	46	WO-04T-1	7- 8	53
MN-02T-2	6- 9	37	WO-05T-1	7- 8	50
MN-02T-2	8-14	50	SM-05R	7- 9	97
MN-02T-3	6- 3	37	SM-06R	7- 9	103
MN-02T-3	8-14	45	SM-10R	7- 9	75
MN-03T-1	6- 3	41	SM-03T-3	7- 9	107
MN-03T-1	8-14	42	SM-04T-4	7- 9	107
MN-03T-2	6- 3	32	SM-07T-1	7- 9	104
MN-03T-2	8-14	44			

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986

[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
RI-01R	5/27/1986	283	8.0	21.7	7.4
NA-02R	5/27/1986	287	8.0	21.6	8.9
OR-01R	5/27/1986	298	7.6	22.5	8.4
AD-01R	5/27/1986	309	7.5	22.4	8.3
DM-03R	5/21/1986	352	7.3	22.8	5.2
DM-03R	5/21/1986	353	7.4	23.8	5.0
DM-03R	5/21/1986	351	7.4	23.9	5.0
DM-03R	5/21/1986	353	7.3	23.8	6.7
DM-03R	5/21/1986	355	7.3	23.4	5.4
DM-03R	5/21/1986	355	7.3	23.5	5.0
DM-03R	5/21/1986	354	7.3	23.5	5.0
DM-03R	5/23/1986	374	7.3	23.2	6.4
DM-03R	5/23/1986	373	7.3	23.2	5.9
DM-04R	5/21/1986	339	7.3	22.3	5.5
DM-04R	5/21/1986	336	7.4	22.3	5.6
DM-04R	5/21/1986	336	7.4	22.4	5.4
DM-04R	5/21/1986	335	7.7	24.4	7.6
DM-04R	5/22/1986	335	7.7	24.9	7.4
DM-04R	5/22/1986	353	7.7	22.6	8.9
DM-04R	5/22/1986	353	7.7	22.6	8.7
DM-04R	5/22/1986	353	7.7	22.6	8.9
GC-01R	5/23/1986	338	7.7	23.9	8.3
GC-06R	5/28/1986	346	8.4	24.0	10.1
GC-07R	5/28/1986	341	8.1	24.7	11.0
GC-08R	5/28/1986	313	8.0	23.7	9.6
GC-09R	5/21/1986	292	7.4	22.2	6.0
GC-09R	5/21/1986	293	7.5	20.5	6.0
GC-09R	5/21/1986	295	7.6	21.0	6.0
GC-09R	5/21/1986	288	7.6	24.5	7.1
GC-09R	5/21/1986	289	7.6	24.2	6.6
GC-09R	5/21/1986	289	7.7	24.7	6.5
GC-09R	5/22/1986	300	7.4	23.4	6.2
GC-09R	5/22/1986	300	7.4	23.4	6.1
GC-09R	5/22/1986	299	7.4	23.3	6.1
GC-09R	5/28/1986	307	8.2	23.4	10.2
GC-10R	5/28/1986	311	8.0	23.7	9.6
GC-10R	6/ 9/1986	282	8.0	26.5	6.3
GC-10R	6/25/1986	300	7.8	24.7	7.7
GC-10R	6/25/1986	282	8.0	26.5	6.3
GC-01T-2	6/25/1986	398	8.9	26.5	12.1
WC-01R	5/27/1986	337	7.2	22.1	5.4

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued

[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
BB-01R	5/27/1986	308	7.9	21.5	8.7
PY-03R	6/ 9/1986	327	7.6	26.3	7.2
PY-05R	6/20/1986	333	7.6	25.9	6.0
PY-09R	6/ 4/1986	330	7.4	26.0	6.4
PY-10R	6/ 5/1986	330	7.4	26.0	6.4
PM-02R	5/30/1986	342	8.0	25.2	7.7
MN-01R	6/ 4/1986	344	7.7	24.6	6.4
MN-03R	6/ 4/1986	349	7.6	24.6	6.3
MN-02T-1	6/ 9/1986	317	8.0	26.8	7.1
MN-02T-2	6/ 9/1986	335	8.3	25.9	7.9
MN-03T-3	5/20/1986	326	8.6	23.8	8.7
MN-03T-3	6/ 3/1986	315	8.0	26.3	7.0
NP-01R	6/10/1986	6080	7.7	26.1	8.1
NP-03R	6/10/1986	8180	7.1	25.2	6.0
NP-05R	6/10/1986	10700	7.3	25.0	5.5
NP-06R	6/12/1986	7820	7.5	25.4	7.0
NP-09R	6/12/1986	11430	7.3	25.5	5.6
NP-11R	6/12/1986	10930	8.1	28.9	9.8
NP-14R	6/12/1986	11490	7.6	26.5	7.6
NY-01T-1	6/10/1986	7970	8.1	29.7	8.5
NY-02T-1	6/10/1986	7460	8.0	29.6	8.7
NY-04T-2	6/10/1986	6330	7.0	26.6	5.1
PO-02T-3	6/12/1986	10330	7.7	28.9	7.9
PO-03T-1	6/12/1986	9300	7.3	30.5	6.9
PY-01R	8/11/1986	383	7.4	28.0	6.4
PY-01R	8/11/1986	393	8.9	27.3	11.0
PY-01R	8/11/1986	383	7.4	28.0	6.3
PY-01R	8/11/1986	383	7.4	28.0	6.2
PY-01R	8/11/1986	383	7.3	27.9	6.2
PY-01R	8/11/1986	383	7.4	28.0	7.3
PY-01R	8/11/1986	383	7.3	28.0	6.1
PY-10R	8/19/1986	459	10.3	27.1	16.6
PY-10R	8/19/1986	459	9.3	27.2	17.3
PY-10R	8/19/1986	456	10.1	26.7	15.8
PY-10R	8/19/1986	458	9.7	27.1	16.6
WO-01R	7/ 8/1986	n.d.	7.7	27.1	6.7
WO-03R	7/ 8/1986	n.d.	7.9	27.7	7.2
WO-08R	7/ 8/1986	n.d.	8.0	29.7	n.d.
WO-01T-1	7/ 8/1986	n.d.	7.8	28.4	7.5
WO-03T-2	7/ 8/1986	n.d.	7.8	30.6	8.1
WO-04T-1	7/ 8/1986	n.d.	8.0	31.0	8.5

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued

[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
WO-05T-1	7/ 8/1986	n.d.	7.8	30.9	8.1
SM-01R	7/ 9/1986	n.d.	8.0	26.2	7.1
SM-03R	7/ 9/1986	n.d.	7.4	26.8	6.4
SM-05R	7/ 9/1986	n.d.	7.9	26.6	7.1
SM-06R	7/ 9/1986	n.d.	8.0	27.6	7.5
SM-10R	7/ 9/1986	n.d.	8.1	27.9	7.5
SM-03T-3	7/ 9/1986	n.d.	7.9	27.5	6.6
SM-04T-4	7/ 9/1986	n.d.	8.2	28.5	8.7
SM-07T-1	7/ 9/1986	n.d.	8.2	28.9	8.3
AD-01R	9/ 8/1986	407	7.0	23.3	6.7
AD-01R	9/29/1986	654	7.2	24.8	5.9
AD-01R	10/16/1986	667	7.4	18.7	8.7
AD-01R	10/28/1986	688	6.6	18.1	7.5
DM-03R	10/ 1/1986	674	6.8	24.8	6.0
DM-04R	5/22/1986	336	7.7	24.9	7.4
DM-04R	10/ 1/1986	621	7.9	24.7	8.0
GC-01R	9/15/1986	577	7.4	23.4	8.3
GC-01R	9/15/1986	577	7.4	23.4	7.9
GC-01R	9/15/1986	578	7.4	23.3	7.8
GC-01R	10/ 1/1986	757	7.2	26.1	7.9
GC-02R	10/ 1/1986	782	7.0	25.9	7.5
GC-03R	9/18/1986	485	7.0	21.1	7.9
GC-03R	9/18/1986	486	7.1	21.0	7.8
GC-10R	10/30/1986	2480	8.3	16.4	11.0
GC-10R	10/30/1986	3550	6.7	17.0	8.6
GC-10R	10/30/1986	3550	6.7	17.0	8.6
AP-08R	10/ 8/1986	9610	7.2	19.0	7.4
AP-10R	10/ 9/1986	10400	7.0	19.9	7.4
AP-12R	10/ 9/1986	11900	7.1	20.7	7.5
AP-14R	10/ 9/1986	12900	7.1	21.2	7.1
AQ-01T-1	10/ 3/1986	8280	7.5	25.5	8.0
AQ-02T-1	10/ 8/1986	8320	8.3	19.9	9.6
AQ-03T-2	10/ 8/1986	6900	8.0	18.1	8.1
PC-02T-1	10/ 9/1986	9110	8.2	19.6	8.8
PC-02T-2	10/ 9/1986	9460	8.1	19.4	9.7
PY-01R	9/29/1986	674	7.4	24.4	6.6
PY-02R	9/ 5/1986	359	8.6	23.2	9.4
PY-02R	9/29/1986	645	7.3	24.3	6.9
PY-03R	9/ 9/1986	442	7.6	23.4	9.0
PY-03R	9/29/1986	611	7.6	23.9	6.2
PY-04R	9/29/1986	650	7.1	24.2	6.8

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued

[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
PY-04R	10/ 1/1986	650	8.2	27.5	11.1
PY-05R	9/ 9/1986	462	7.2	24.5	7.1
PY-05R	9/30/1986	683	7.5	23.9	6.6
PY-06R	8/20/1986	385	8.9	25.8	9.1
PY-06R	8/20/1986	384	8.7	25.8	7.6
PY-06R	8/20/1986	389	8.9	25.8	9.9
PY-06R	8/20/1986	374	8.5	25.8	6.1
PY-06R	8/20/1986	390	8.9	25.9	9.9
PY-06R	8/20/1986	380	8.4	25.8	6.6
PY-06R	8/22/1986	391	7.6	24.7	6.6
PY-06R	8/22/1986	392	7.6	24.8	6.5
PY-06R	8/22/1986	390	7.6	24.6	7.8
PY-06R	8/22/1986	390	7.5	24.6	6.2
PY-06R	8/22/1986	391	7.9	24.3	8.2
PY-06R	8/22/1986	391	7.8	24.3	7.6
PY-06R	8/25/1986	375	8.9	25.4	9.5
PY-06R	8/25/1986	376	8.7	25.2	8.6
PY-06R	8/25/1986	373	9.1	25.3	9.7
PY-06R	8/25/1986	378	8.2	24.9	7.7
PY-06R	8/25/1986	375	8.7	25.2	9.1
PY-06R	8/25/1986	378	8.3	24.4	8.0
PY-06R	9/30/1986	686	7.7	24.5	7.4
PY-06R	11/ 3/1986	879	6.7	15.3	8.2
PY-06R	11/ 3/1986	919	6.7	15.3	8.7
PY-06R	11/ 3/1986	925	6.8	14.8	7.5
PY-06R	11/ 3/1986	1199	6.9	15.6	8.0
PY-06R	11/ 3/1986	946	6.7	15.4	7.8
PY-06R	11/ 3/1986	982	6.8	15.5	6.8
PY-06R	11/ 4/1986	881	7.3	15.8	9.2
PY-06R	11/ 4/1986	876	7.3	14.7	9.1
PY-06R	11/ 4/1986	908	7.5	16.2	9.8
PY-06R	11/ 4/1986	882	7.5	15.1	9.6
PY-06R	11/ 4/1986	975	7.6	16.9	9.1
PY-06R	11/ 4/1986	902	7.5	15.2	8.9
PY-06R	11/ 6/1986	752	7.4	13.4	6.9
PY-06R	11/ 6/1986	751	7.4	13.6	6.8
PY-06R	11/ 6/1986	758	7.1	12.4	7.6
PY-06R	11/ 6/1986	758	7.5	12.4	6.8
PY-06R	11/ 6/1986	724	7.4	13.7	6.8
PY-06R	11/ 6/1986	715	7.4	13.9	7.0
PY-07R	9/30/1986	817	7.3	24.6	7.8

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued
[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
PY-08R	9/15/1986	654	7.0	22.8	7.4
PY-08R	9/15/1986	626	6.9	22.8	7.1
PY-08R	9/15/1986	627	6.9	22.8	6.9
PY-08R	9/30/1986	766	7.5	24.4	7.6
PY-09R	8/20/1986	473	7.4	26.0	7.2
PY-09R	8/20/1986	472	7.4	26.1	7.1
PY-09R	8/20/1986	509	7.0	26.3	6.9
PY-09R	8/20/1986	509	7.1	26.3	6.5
PY-09R	8/20/1986	512	6.8	26.2	6.4
PY-09R	8/20/1986	512	6.9	26.3	6.2
PY-09R	8/22/1986	440	7.7	24.1	8.1
PY-09R	8/22/1986	445	7.6	24.0	7.7
PY-09R	8/22/1986	444	6.5	24.1	8.9
PY-09R	8/22/1986	448	7.0	24.1	7.1
PY-09R	8/22/1986	434	7.4	23.9	6.1
PY-09R	8/22/1986	437	7.3	23.7	5.5
PY-09R	8/25/1986	441	7.6	25.3	7.8
PY-09R	8/25/1986	441	7.6	25.3	7.9
PY-09R	8/25/1986	446	7.6	25.4	9.3
PY-09R	8/25/1986	445	7.6	25.4	8.4
PY-09R	8/25/1986	440	8.7	25.2	8.8
PY-09R	8/25/1986	441	7.5	25.4	8.3
PY-09R	9/ 8/1986	527	6.8	23.7	8.4
PY-09R	11/ 3/1986	1203	7.1	14.8	8.0
PY-09R	11/ 3/1986	1393	7.1	15.1	7.8
PY-09R	11/ 3/1986	1780	7.0	15.4	8.0
PY-09R	11/ 3/1986	1782	7.0	15.4	8.1
PY-09R	11/ 3/1986	1870	6.8	15.4	8.3
PY-09R	11/ 3/1986	1940	6.9	15.5	8.2
PY-09R	11/ 4/1986	1587	7.0	15.1	7.6
PY-09R	11/ 4/1986	1582	7.6	15.1	7.6
PY-09R	11/ 4/1986	1484	7.0	15.4	8.0
PY-09R	11/ 4/1986	1700	7.0	15.2	8.0
PY-09R	11/ 4/1986	1692	7.1	15.3	8.2
PY-09R	11/ 4/1986	1755	7.0	15.2	8.0
PY-09R	11/ 6/1986	1307	7.5	13.0	7.7
PY-09R	11/ 6/1986	1314	7.5	13.0	7.4
PY-09R	11/ 6/1986	1295	7.4	13.1	7.3
PY-09R	11/ 6/1986	1293	7.4	13.1	7.1
PY-09R	11/ 6/1986	1254	7.5	13.4	7.5
PY-09R	11/ 6/1986	1234	7.4	13.3	7.5

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued

[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
PY-10R	8/20/1986	530	5.5	26.5	n.d.
PY-10R	8/20/1986	528	7.2	26.6	n.d.
PY-10R	8/20/1986	527	8.3	26.6	n.d.
PY-10R	8/20/1986	527	9.1	26.6	n.d.
PY-10R	8/20/1986	529	6.8	26.6	5.9
PY-10R	8/20/1986	530	7.0	26.5	5.8
PY-10R	8/22/1986	617	7.7	23.9	8.0
PY-10R	8/22/1986	618	7.5	23.9	7.8
PY-10R	8/22/1986	670	8.1	23.9	8.9
PY-10R	8/22/1986	692	7.7	23.9	7.1
PY-10R	8/22/1986	615	10.3	23.8	n.d.
PY-10R	8/22/1986	650	10.3	23.8	n.d.
PY-10R	8/25/1986	552	8.3	25.7	9.3
PY-10R	8/25/1986	550	8.2	25.7	9.1
PY-10R	8/25/1986	553	8.1	25.6	9.3
PY-10R	8/25/1986	548	8.1	25.6	9.3
PY-10R	8/25/1986	555	8.1	25.6	9.1
PY-10R	8/25/1986	554	8.2	25.6	9.0
PY-10R	9/ 8/1986	586	7.1	23.4	9.9
PY-10R	11/ 3/1986	2350	7.0	15.2	8.7
PY-10R	11/ 3/1986	2350	7.0	15.2	8.6
PY-10R	11/ 3/1986	2430	7.0	15.1	8.7
PY-10R	11/ 3/1986	2430	7.0	15.7	8.7
PY-10R	11/ 3/1986	2330	7.0	15.1	9.1
PY-10R	11/ 3/1986	2310	7.0	15.1	8.9
PY-10R	11/ 4/1986	2110	7.2	14.8	9.1
PY-10R	11/ 4/1986	2090	7.1	14.8	9.2
PY-10R	11/ 4/1986	1926	7.0	15.3	8.2
PY-10R	11/ 4/1986	1948	7.0	15.3	7.9
PY-10R	11/ 4/1986	2040	7.0	15.2	8.3
PY-10R	11/ 4/1986	2020	7.0	15.3	8.5
PY-10R	11/ 6/1986	2160	7.5	12.0	8.7
PY-10R	11/ 6/1986	2160	7.5	12.0	8.5
PY-10R	11/ 6/1986	1833	7.5	12.2	8.5
PY-10R	11/ 6/1986	1831	7.5	12.1	8.3
PY-10R	11/ 6/1986	1924	7.5	11.8	8.6
PY-10R	11/ 6/1986	2020	7.5	11.9	8.4
PY-01T-1	9/ 8/1986	390	7.0	23.2	6.9
PY-01T-2	9/30/1986	577	8.7	24.7	10.3
PM-02R	10/ 3/1986	1606	7.6	25.5	8.2
MN-08R	10/ 3/1986	6070	7.1	24.8	7.3

Table C-2--Conductivity, pH, temperature, and dissolved oxygen in the tidal Potomac River and Estuary, May-November 1986--continued
[Cond is specific conductance in micromhos per centimeter; Temp is temperature in degrees Celsius; DO is dissolved oxygen in milligrams per liter; n.d. is no data available]

Transect	Date	Cond	pH	Temp	DO
MN-08R	10/ 3/1986	6070	7.1	24.8	7.3
MN-01T-4	10/ 3/1986	4070	7.8	25.5	8.1
MN-04T-2	9/23/1986	2280	8.2	24.5	9.4
MP-01R	9/23/1986	5700	7.0	21.8	8.1
MP-03R	9/23/1986	6190	7.2	22.0	7.9
MP-05R	9/23/1986	6310	7.5	22.4	8.5
MP-07R	9/23/1986	7590	8.4	23.4	9.0
MP-09R	9/23/1986	9020	8.1	24.3	8.7
NP-02R	10/ 9/1986	16100	7.2	21.8	7.6
NP-03R	10/ 8/1986	14550	7.3	21.5	7.5
NP-06R	9/25/1986	11980	7.6	23.2	7.3
NP-08R	9/25/1986	13400	7.5	24.4	7.1
NP-10R	9/25/1986	13100	7.8	25.5	8.7
NY-01T-1	10/ 7/1986	14960	7.6	19.9	8.9
NY-02T-1	10/ 7/1986	14300	7.4	19.4	8.0
NY-03T-2	10/ 7/1986	13700	7.3	19.0	7.8
NY-03T-3	9/25/1986	10740	7.5	24.5	7.4
NY-04T-2	10/ 7/1986	13500	7.1	18.7	7.6
PO-03T-2	9/25/1986	12300	7.6	26.5	26.5

Appendix D. Summary of 1984, 1985, and 1986 data.

Table D-1.--Summary of distribution of submersed aquatic vegetation and Secchi depth data in the tidal Potomac River, 1984-1986.

			1984	1985	1986
a.	Hectares (Acres)		243 (600)	1457 (3600)	1457 (3600)
b.	Length of vegetated reach[1]	Va:	26 km.	29 km.	31 km.
		Md:	24 km.	27 km.	37 km.
c.	Length of vegetated reach containing *Hydrilla*	Va:	19 km.	24 km.	29 km.
		Md:	24 km.	27 km.	37 km.
d.	Location of isolated areas of *Hydrilla* further downstream		Mallows Bay, Md. and Chicamuxen Creek, Md.	Mallows Bay, Md.	Mallows Bay, Md.[2]
e.	Relative occurrence of vegetated transects fall[3]		14/58 (28%)	23/58 (40%)	24/58 (41%)
	Above Marshall Hall		11/21 (52%)	18/21 (86%)	19/21 (90%)
	Below Marshall Hall		3/37 (8%)	5/37 (14%)	5/37 (14%)
f.	Number of species		13	10	12
g.	Mean Secchi depth:				
	Above Marshall Hall		89 ± 34 cm.	87 ± 31 cm.	89 ± 33 cm.
	Below Marshall Hall		54 + 17 cm.	55 + 19 cm.	55 + 15 cm.

[1]Starting from Washington channel (near the confluence of the Anacostia River and the Potomac River) and going downstream.

[2]*Hydrilla* died off by August 1986, probably due to unusually high salinity.

[3]Number of vegetated transects/total number of transects (percent).

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