1995 Distribution Of Submerged Aquatic Vegetation In the Chesapeake Bay

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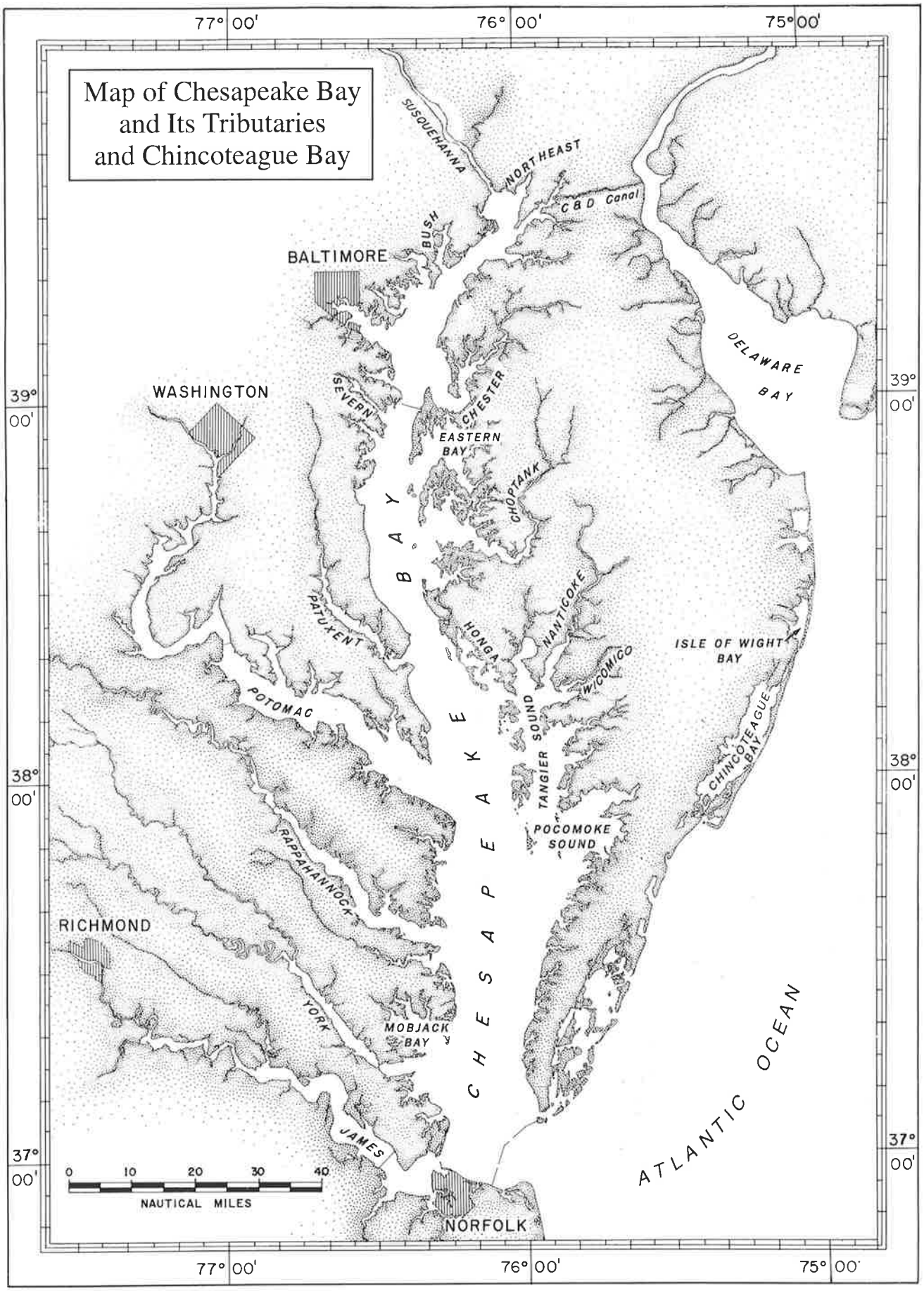
Map of Chesapeake Bay and Its Tributaries and Chincoteague Bay
77° 00'
76° 00'
75° 00'
39° 00'
38° 00'
37° 00'
SUSQUEHANNA
NORTHEAST
C & D Canal
BUSH
BALTIMORE
WASHINGTON
SEVERN
CHESTER
EASTERN BAY
CHOPTANK
DELAWARE BAY
PATUXENT
HONGA
NANTICOKE
WICOMICO
ISLE OF WIGHT BAY
POTOMAC
TANGIER SOUND
CHINCOTEAGUE BAY
POCOMOKE SOUND
RAPPAHANNOCK
RICHMOND
YORK
MOBJACK BAY
JAMES
CHESAPEAKE BAY
ATLANTIC OCEAN
NORFOLK
0 10 20 30 40
NAUTICAL MILES

Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay and Tributaries and Chincoteague Bay - 1995

by

Robert J. Orth, Judith F. Nowak, Gary F. Anderson, David J. Wilcox,
Jennifer R. Whiting, and Leah S. Nagey

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

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Cover Photograph: aerial view of seagrass beds (consisting of eelgrass, *Zostera marina,* and widgeon grass, *Ruppia maritma*) looking south toward New Point Comfort from Dyer Creek and Bavon Beach, Mathews County, Virginia, 11 May 1996 (Chesapeake Bay Program Segment CB6). (Courtesy of George Thomas, Shoreline Studies Program, Department of Physical Sciences, Virginia Institute of Marine Science.)

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EXECUTIVE SUMMARY

The distribution of submerged aquatic vegetation (SAV), principally rooted vascular macrophytes, in the Chesapeake Bay, its tributaries, and the Chincoteague Bay section, was mapped from black-and-white aerial photographs taken during May to October 1995 at a scale of 1:24,000. SAV bed perimeter information was digitized and stored in a computerized database.

SAV distribution data in this report are presented and discussed based on the segmentation scheme adopted by the Chesapeake Bay Program (Flemer *et al.*, 1983) and described briefly in the Methods section of this report. This zonation scheme (Upper, Middle, and Lower zones) for Chesapeake Bay, which accommodates the Chesapeake Bay Program segmentation boundaries, was adapted from that used in previous SAV distribution reports (i.e., Orth *et al.*, 1994) and established by Orth and Moore (1982), then modified by Orth *et al.*, (1989). The 1995 data were edgematched using ARC/INFO GIS software, as were all the historical SAV bed data, in order to bring separately digitized USGS 7.5 minute topographic quadrangle SAV coverages into one unified coverage for the entire Chesapeake Bay (see Methods). Therefore, SAV distribution data presented in this report reflect edgematching adjustments, and differ from previously published data for these years derived from separate coverages which were not edgematched (i.e., Orth *et al.*, 1992, 1993, and 1994).

1995 SUMMARY

SAV in the Chesapeake Bay decreased 8% in 1995 to a total of 24,251.57 hectares mapped from aerial photography, a 2,232.81 hectare decline from the 26,484.38 hectares mapped in 1994 (Figure 1; VIMS SAV GIS Database). This follows a 10% decrease in 1994 from the 29,587.47 hectares in 1993 and is the lowest level since the 1989 level of 24,151.49 hectares (VIMS SAV GIS Database). SAV also decreased in all three zones of the Chesapeake Bay in 1995 (14%, 8%, and 7% in the Upper, Middle, and Lower zones, respectively) compared to 1994 when SAV increased only in the Upper zone (44%) and decreased in the Middle and Lower zones 21% and 8%, respectively, from totals in 1993 (Figure 2; Orth *et al.*, 1995; VIMS SAV GIS Database). In 1995, SAV decreased 529.61 hectares in the Upper zone, with a total of 3,324.21 hectares (14% of the Bay total) mapped, compared with 3,853.82 hectares (15% of the Bay total) mapped in 1994 (Figure 2). SAV decreased 1,096.84 hectares in the Middle zone, with 12,276.42 hectares (51% of the Bay total) mapped in 1995, compared to 13,373.26 hectares (50% of the Bay total) mapped in 1994 (Figure 2). SAV decreased 606.36 hectares in the Lower zone, with 8,650.94 hectares (36% of the Bay total) mapped, compared to 9,257.30 hectares (35% of the Bay total) mapped in 1994 (Figure 2). SAV increased in only five segments in the Upper Bay zone in 1995, decreased in six (WT5 became unvegetated), and WT1 and WT4 remained unvegetated, compared to 1994, when SAV increased from 1993 levels in all segments except for WT1 and WT4 which remained unvegetated (Figure 3; Orth *et al.*, 1995; VIMS SAV GIS Database). As in 1994, increases in 1995 for some segments of the Middle and Lower zones did not offset larger decreases in 1995 in other segments of these zones (Orth *et al.*, 1995; VIMS SAV GIS Database). In the Middle Bay zone in 1995, there were increases in five segments, decreases in eight, and seven were unvegetated (six remained unvegetated from 1994)

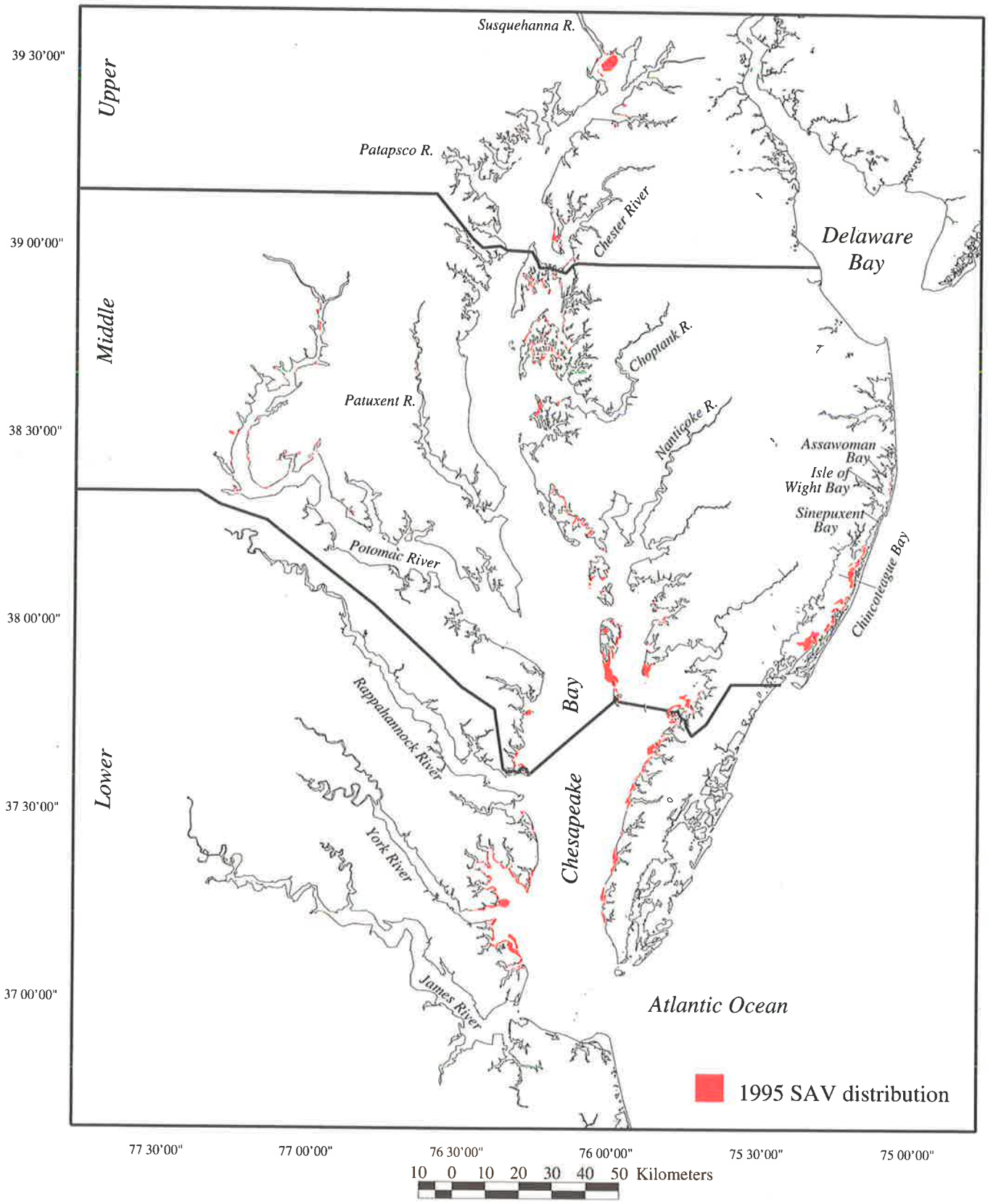
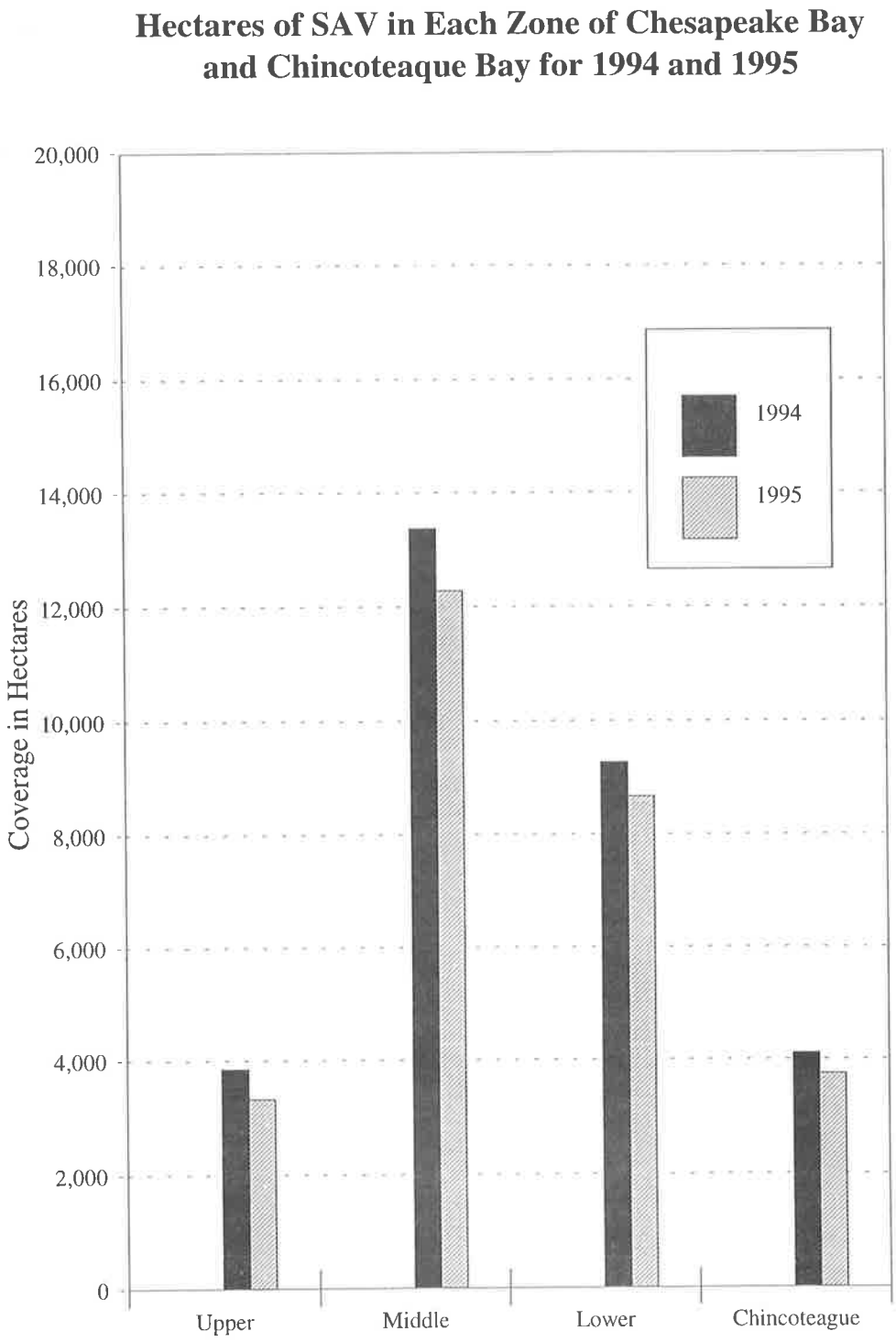


Figure 1: Location of the 1995 SAV beds in Chesapeake Bay (Upper, Middle, and Lower zones), tributaries, and the Chincoteague Bay section.



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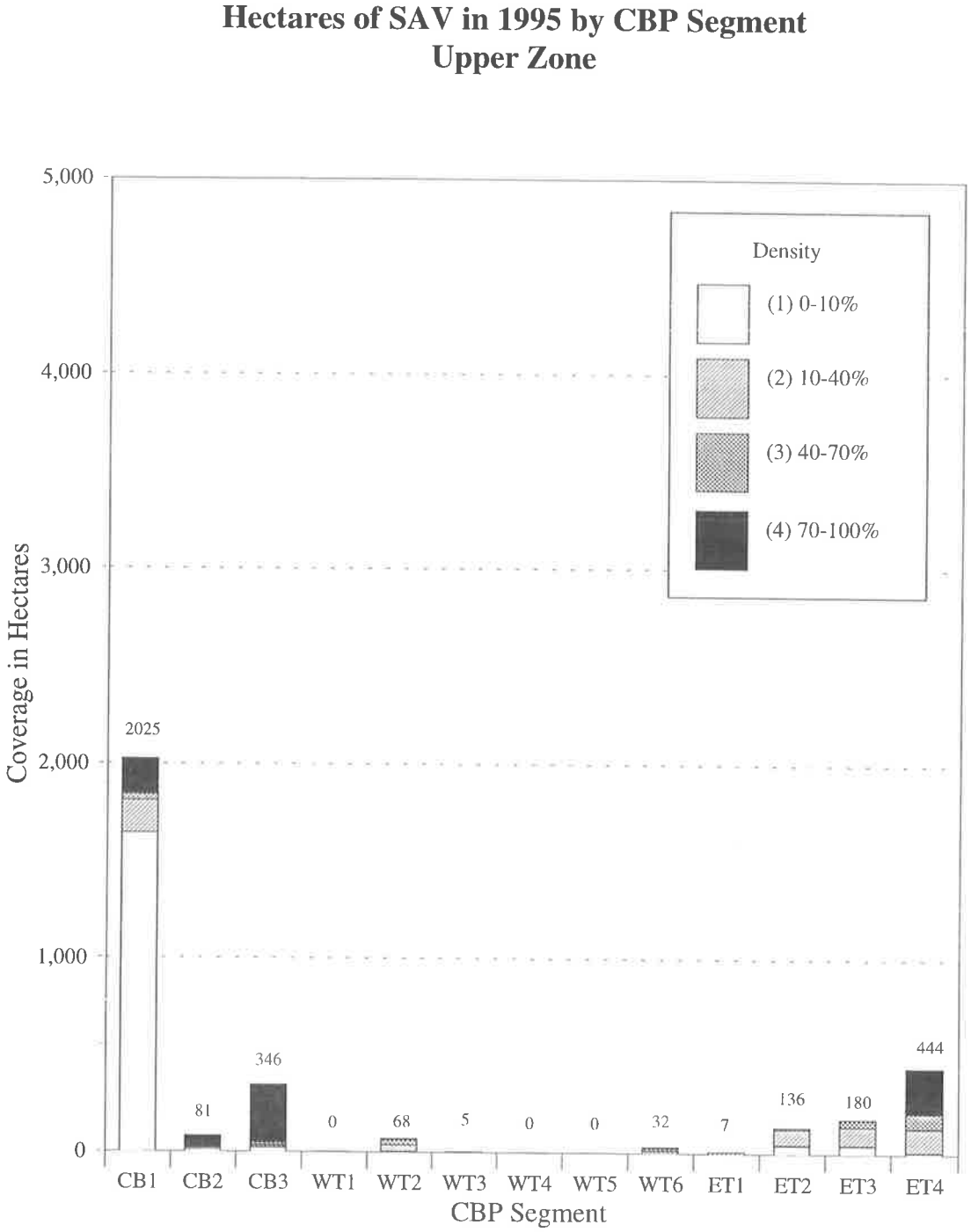

Figure 3. Number of hectares of SAV per density class in 1995 by segment in the Upper Bay Zone of Chesapeake Bay (Refer to Figure 9, Table 4, and Appendix B for segment locations and boundaries.)

compared to 1994 when there were increases in six segments, decreases in ten, and six were unvegetated; and in the Lower Bay zone in 1995, there were increases in three segments, decreases in four, and six remained unvegetated from 1994, compared to 1994 when there were increases in three segments, decreases in four, and six were unvegetated (Figures 4 and 5; Orth *et al.,* 1995).

In 1995, SAV in the Bay increased in thirteen segments (Upper zone: CB2, CB3, WT6, ET3, ET4; Middle zone: WT7, LE2, ET8, ET9, EE1; and Lower zone: LE4, LE5, WE4), compared to twenty segments in 1994 (Upper zone: CB1, CB2, CB3, WT2, WT3, WT5, WT6, ET1, ET2, ET3, ET4; Middle zone: WT7, WT8, TF1, RET1, LE2, EE1; and Lower zone: CB8, LE4, LE5) (Orth *et al.,* 1995). In 1995, SAV decreased in eighteen segments (Upper zone: CB1, WT2, WT3, WT5, ET1, ET2; Middle zone: CB5, WT8, TF1, RET1, TF2, RET2, EE2, EE3; Lower zone: CB6, CB7, CB8, LE3) compared to fourteen segments in 1994 (Middle zone: CB4, CB5, LE1, TF2, RET2, ET5, ET8, ET9, EE2, EE3; and Lower zone: CB6, CB7, LE3, WE4) (Orth *et al.,* 1995). In 1995, sixteen were unvegetated (Upper zone: WT1, WT4, WT5; Middle zone: CB4, RET1, LE1, ET5, ET6, ET7, ET10; and Lower zone: TF3, RET3, TF4, RET4, TF5, RET5), compared to fourteen in 1994 (Upper zone: WT1, WT4; Middle zone: CB4, LE1, ET5, ET6, ET7, ET10; and Lower zone: TF3, RET3, TF4, RET4, TF5, RET5) (Orth *et al.,* 1995). [The mainstem upper and middle Rappahannock River, TF3 and RET3, upper and middle York River, TF4 and RET4, and upper and middle James River, TF5 and RET5, have been devoid of submerged vegetation for years and are not currently photographed (Orth *et al.,* 1995; VIMS SAV GIS Database).] There were no segments which were unvegetated in 1994 which had SAV detected by photography in 1995 (Orth *et al.,* 1995; VIMS SAV GIS Database). Two segments (Upper zone: WT5; Middle zone: RET1) which were vegetated in 1994, albeit with relatively small amounts, had no SAV detected in 1995, compared to three segments (CB4, LE1, and ET5), all in the Middle zone, which were vegetated in 1993 but had no SAV detected in 1994 or 1995 (Orth *et al.,* 1995; VIMS SAV GIS Database).

In the Bay in 1995, 44% of SAV was categorized as dense (density class 4, or 70-100% coverage), up slightly from the 1994 amount of 36% (Orth *et al.,* 1995; VIMS SAV GIS Database). In 1995, 12% of SAV was categorized as moderate (density class 3, or 40-70% coverage), down slightly from the 1994 amount of 19% (Orth *et al.,* 1995; VIMS SAV GIS Database). There was 26% of SAV categorized as sparse (density class 2, or 10-40% coverage), a decrease compared with the 1994 amount of 28%; whereas 17% was categorized as very sparse (density class 1, or 0-10% coverage), the same as in 1994 (Orth *et al.,* 1995; VIMS SAV GIS Database). SAV in the very sparse and sparse classes combined (the 0-40% coverage range) constituted 44% of all SAV in 1995, a slight decrease from 45% in 1994 (Orth *et al.,* 1995; VIMS SAV GIS Database). Conversely, SAV in the moderate and dense classes combined (the 40-100% coverage range) constituted 56% of all SAV in 1995, an slight increase from 55% in 1994 (Orth *et al.,* 1995; VIMS SAV GIS Database).

The Chincoteague Bay section (consisting of Chincoteague, Assawoman, Sinepuxent, and Isle of Wight bays) had 3,758.29 hectares in 1995, with 15% classified dense, compared to 4,117.53 hectares in 1994, with 55% classified dense (Figure 2; Tables 5-9).

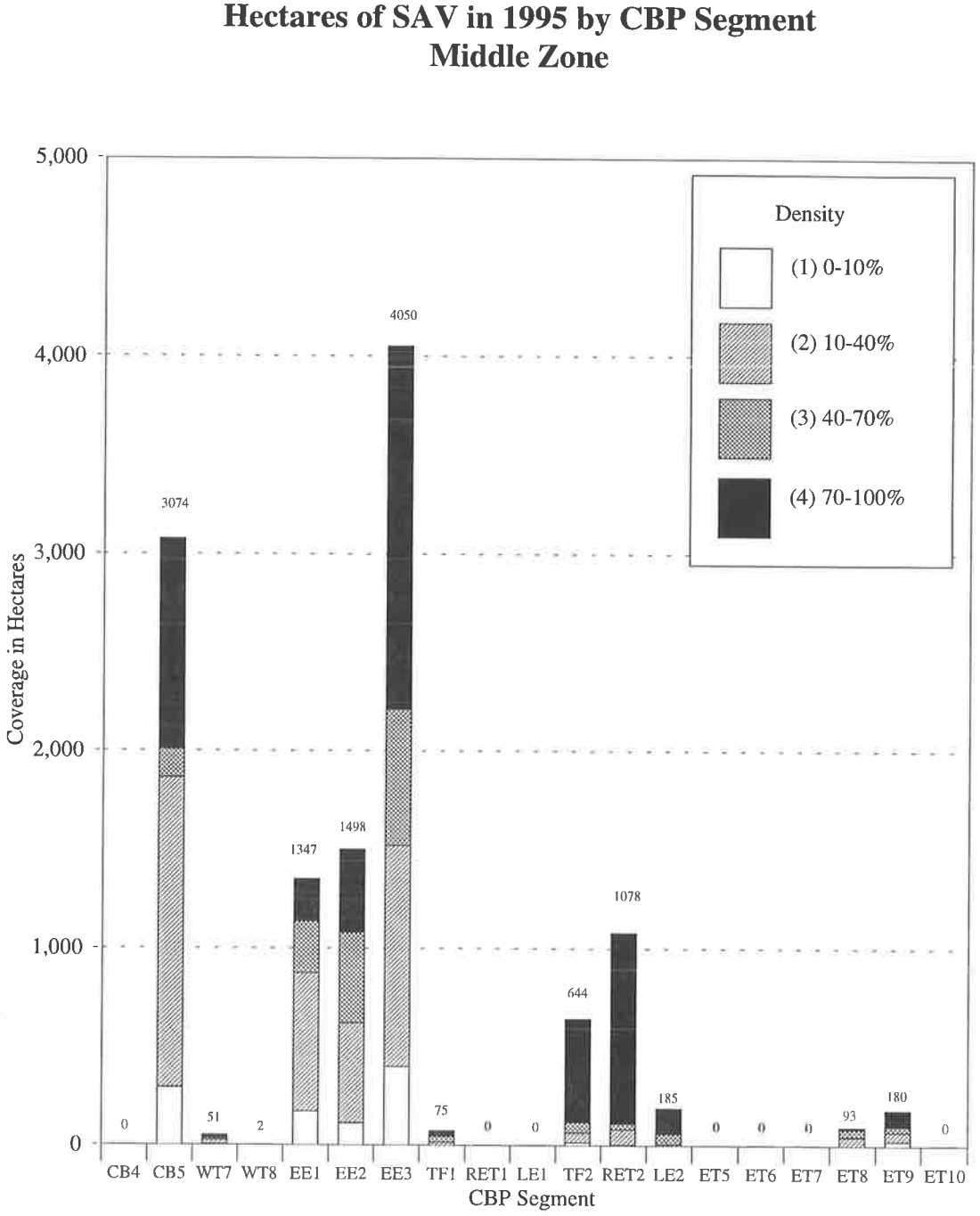

Figure 4. Number of hectares of SAV per density class in 1995 by segment in the Middle Bay Zone of Chesapeake Bay (Refer to Figure 9, Table 4, and Appendix B for segment locations and boundaries.)

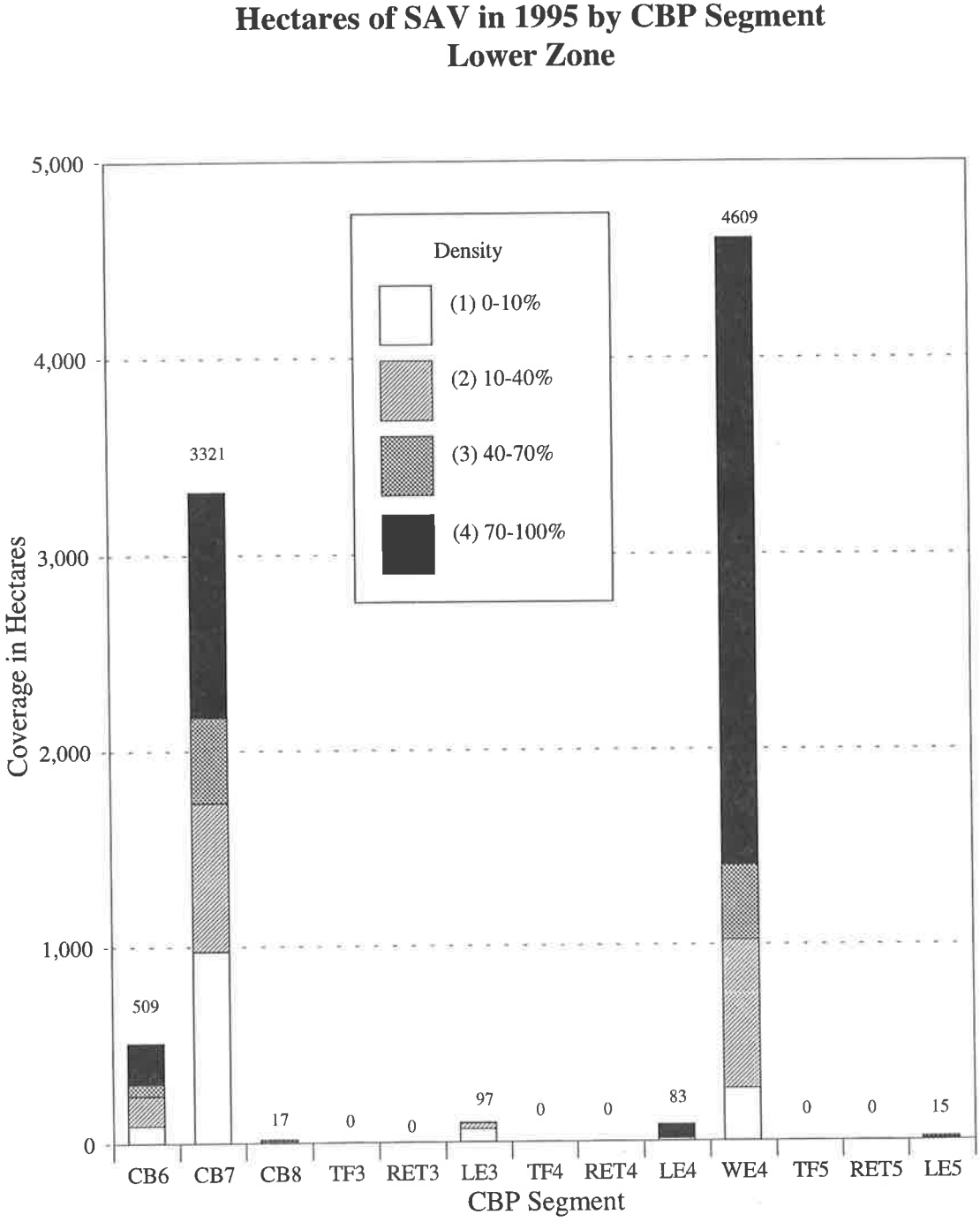

Figure 5. Number of hectares of SAV per density class in 1995 by segment in the Lower Bay Zone of Chesapeake Bay (Refer to Figure 9, Table 4, and Appendix B for segment locations and boundaries.)

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Acknowledgments would not be complete without commendation for the groups that provided groundtruthing of SAV beds, which was used in conjunction with interpretation of the 1995 photography. The USFWS with the Chesapeake Bay Foundation organized citizens to report locations and species composition of grass beds around the bay. Kathryn Reshetiloff of the USFWS was responsible for compiling and tabulating the citizen ground-truth data. Stan Kollar of Harford Community College (HCC) in Maryland, Dr. William Hilgartner of The Johns Hopkins University, Kent Mountford of the USEPA, and Peter Bergstrom of the USFWS, provided ground-truth data for certain specific regions of the Maryland portion of the Bay. Virginia Carter and Nancy Rybicki of the USGS National Center provided ground-truth data for the Potomac River. The Maryland Patuxent River Park staff, provided ground-truth data for the Patuxent River. Ken Moore and Matthew Harwell of VIMS Department of Biological Sciences, as well as the faculty, staff and students of the VIMS Crustacean Ecology program, provided ground-truth data for the lower bay. The National Park Service (NPS) and the Ocean Pines Boat Club of Berlin, Maryland, provided ground truth for Chincoteague, Isle of Wight, Sinepuxent, and Assawoman bays.

The production of this report required the dedication of numerous scientists, technicians, artists, photographers, and others. The following people deserve a note of thanks: Rich Batiuk and Carin Bisland, USEPA-Chesapeake Bay Program Office; Kathryn Reshetiloff, USFWS; and Peter Bergstrom of the USFWS. We are especially grateful to the dedicated VIMS personnel who contributed greatly to the production of this report: Jane Lopez, Jerry Harrison, and Connie Motley of the Sponsored Programs office provided grant administration; Pat Hall, Rob Hayhurst, Steve Clukey, and Suzanne Alexander of Information Technology and Network Services provided computer services; Gina Burrell, Alice Tillage, and Jean King of the Department of Biological Sciences provided secretarial and purchasing services; Wanda Cohen, Kay Stubblefield, Harold Burrell, Bill Jenkins, and Sylvia Motley of the VIMS Publications Center provided report production services; Tom Pierce provided security; and George Thomas of the Shoreline Studies Program, Department of Physical Sciences, provided the aerial photograph used on the cover.

Air Photographics, Inc. conducted the aerial photographic missions and was responsible for the high quality aerial photographs.

SAV SPECIES

The term "submerged aquatic vegetation" (SAV) for the purpose of this report encompasses twenty taxa from ten vascular macrophyte families and three taxa from one freshwater macrophytic algal family, the Characeae. SAV excludes all other algae, both benthic and planktonic, which occur in Chesapeake Bay and its tributaries (Appendix A). Although these other algae do constitute a portion of the SAV biomass in Chesapeake Bay and its tributaries (Humm, 1979), this study did not attempt to identify, delineate, or discuss the algal component of the vegetation nor its relative importance in the flora, except for the Characeae. This is the case, for example, with the benthic marine algae, including many macrophytes, which sometimes co-occur in the same beds as vascular plants, even as epiphytes on vascular plants.

Ten species of submerged aquatic vegetation are commonly found in the Chesapeake Bay and its tributaries. *Zostera marina* (eelgrass) is dominant in the lower reaches of the bay. *Myriophyllum spicatum* (Eurasian watermilfoil), *Potamogeton pectinatus* (sago pondweed), *Potamogeton perfoliatus* (redhead grass), *Zannichellia palustris* (horned pondweed), *Vallisneria americana* (wild celery), *Elodea canadensis* (common elodea), *Ceratophyllum demersum* (coontail), and *Najas guadalupensis* (southern naiad) are less tolerant of high salinities and are found in the middle and upper reaches of the bay (Stevenson and Confer, 1978; Orth *et al.*, 1979; Orth and Moore, 1981, 1983). *Ruppia maritima* (widgeon grass) is tolerant of a wide range of salinities and is found from the bay mouth to the Susquehanna Flats. Approximately 13 other species are only occasionally found. When present, these species occur primarily in the middle and upper reaches of the bay and the tidal rivers (Appendix A). *Hydrilla verticillata* (hydrilla), a recently introduced species, continues to dominate SAV beds in the tidal freshwater reaches of the Potomac River, although many of the large beds of hydrilla have recently declined. It was also reported again in 1995, in the Susquehanna River and Flats, where its growth was not as widespread as in the Potomac River (Kollar, pers. comm.), as well as the Patuxent river tidal freshwater areas.

Zostera marina and *R. maritima* are the species reported from the Chincoteague Bay section.

METHODS

INTRODUCTION

Black-and-white aerial photography at a scale of 1:24,000 was the principal source of information used to assess distribution and abundance of SAV in Chesapeake Bay, its tributaries, and Chincoteague Bay in 1995. For the purpose of this report, the Chincoteague Bay section includes four barrier island bays: Chincoteague, Assawoman, Sinepuxent, and Isle of Wight. There were 1,511 photographs from 138 flight lines which were carefully examined to identify all SAV beds visible on the photography. Outlines of SAV beds were subsequently drawn onto USGS 7.5 minute quadrangles and then digitized, which provided a digital database for analysis of bed areas and locations. Ground survey information collected in 1995 was tabulated, placed onto the same 7.5 minute quadrangles, and entered into the SAV digital database.

AERIAL PHOTOGRAPHY

The 1995 SAV aerial photography was obtained by Air Photographics (Martinsburg, West Virginia) using a Wild RC-20 camera with a 153 mm (6 inch) focal length Aviogon lens and Agfa Pan 200 film. The camera was mounted in the bottom fuselage of Air Photographics' Piper Aztec, a twin engine reconnaissance aircraft. Photography was acquired at an altitude of approximately 12,000 feet, which yielded 1:24,000 scale photographics.

There were 138 flight lines covering 1,772 miles of shoreline and yielding 1,511 exposures. Flight lines were numbered and included land features that were necessary to establish control points for accurate mapping (Figure 6). Flight lines to obtain the photography were predetermined by Air Photographics to include all areas known to have SAV, as well as most areas which could potentially have SAV in the middle and upper zones [i.e., all areas where water depths were less than 2 meters at mean low water (mlw)]. In the lower zone, sections of the upper Rappahannock and upper York rivers, and most of the James River were not photographed for analysis because of the continued absence of SAV in these areas as evidenced by ground truth.

Flight lines were prioritized by sections. Flights were timed to occur during the peak growing season of species known to occur in the sections. In addition, specific areas with significant SAV coverage were given priority. Dates of photography for each quadrangle are noted on each map in Appendix B.

General guidelines followed during acquisition of aerial photography (Table 1) address tidal stage, plant growth, sun elevation, water and atmospheric transparency, turbidity, wind, sensor operation, and plotting. Adherence to these guidelines assured acquisition of photography under nearly optimal conditions for detection of SAV, thus insuring accurate photo interpretation. Deviation from any of

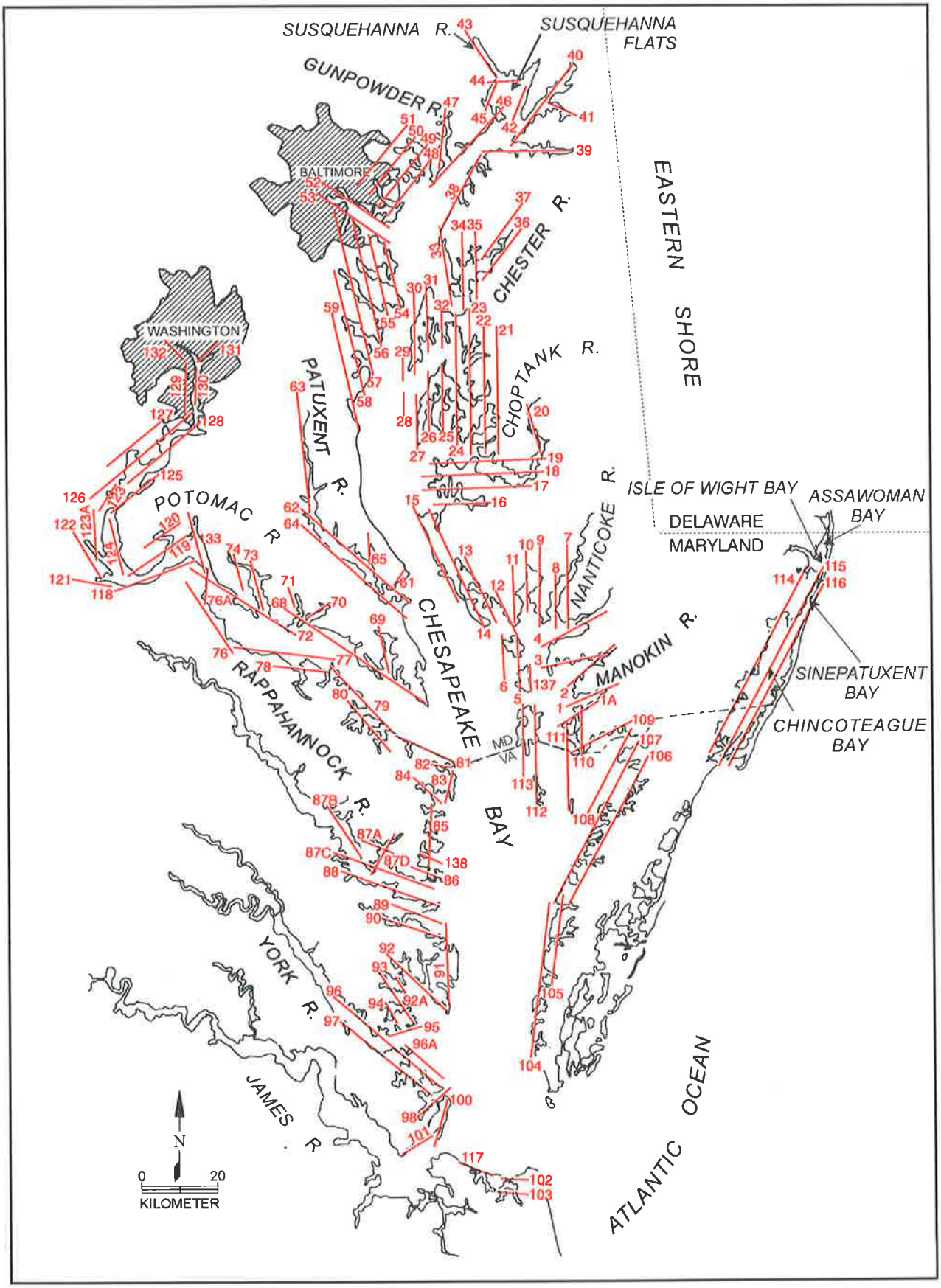

Figure 6. Map of Chesapeake Bay, its tributaries, and of Chincoteague Bay with approximate locations of flight lines for 1995 SAV photography.

TABLE 1

Guidelines Followed During Acquisition of Aerial Photographs.

1. **Tidal Stage** - Photography was acquired at low tide, +/- 0-1.5 ft., as predicted by the National Ocean Survey tables.

2. **Plant Growth** - Imagery was acquired when growth stages ensured maximum delineation of SAV, and when phenologic stage overlap was greatest.

3. **Sun Angle** - Photography was acquired when surface reflection from sun glint did not cover more than 30 percent of frame. Sun angle was generally between 20° and 40° to minimize water surface glitter. At least 60 percent line overlap and 20 percent side lap was used to minimize image degradation due to sun glint.

4. **Turbidity** - Photography was acquired when clarity of water ensured complete delineation of grass beds. This was visually determined from the airplane to insure that SAV could be seen by the observer.

5. **Wind** - Photography was acquired during periods of no or low wind. Off-shore winds were preferred over on-shore winds when wind conditions could not be avoided.

6. **Atmospherics** - Photography was acquired during periods of no or low haze and/or clouds below aircraft. There could be no more than scattered or thin broken clouds, or thin overcast above aircraft, to ensure maximum SAV to bottom contrast.

7. **Sensor Operation** - Photography was acquired in the vertical mode with less than 5 degrees tilt. Scale/altitude/film/focal length combination permitted resolution and identification of one square meter area of SAV (at the surface).

8. **Plotting** - Each flight line included sufficient identifiable land area to assure accurate plotting of grass beds.

these guidelines required prior approval by VIMS staff. Quality assurance and calibration procedures were consistently followed. The altimeter was calibrated annually by the Federal Aviation Administration. Camera settings were selected by automatic exposure control. Sun angle was measured with a sensor on the plane. Flight lines were plotted on 1:250,000 scale maps to allow for overlap of photography. To minimize image degradation due to sun glint, the camera was equipped with a computer controlled intervalometer which established 60% line overlap and 20% sidelap. An automatic bubble level held the camera to within one degree tilt. The scale/altitude/film/focal length combination was coordinated so that SAV patches of one square meter could be resolved. Ground-level wind speed was monitored hourly. Under normal operating conditions, flights were usually conducted under wind speeds less than 10 mph. Above this speed, wind-generated waves stir bottom sediments which can easily obscure SAV beds in less than one hour. The pilot used experiential knowledge to determine what acceptable level of turbidity would allow complete delineation of SAV beds. During optimum flight conditions the pilot was able to distinguish bottom features such as SAV or algae at low tide. Excessively turbid conditions precluded photography. Determination of optimum cloud cover level was based on pilot experience. Records of this parameter were kept in a flight notebook. Every attempt was made to acquire photographs when there was no cloud cover below 12,000 feet. Cloud cover did not exceed 5% of the area covered by the camera frame. A thin haze layer above 12,000 feet was generally acceptable. Experience with the Chesapeake Bay has shown that optimal atmospheric conditions generally occur two to three days following passage of a cold front, when winds have shifted from north-northwest to south and have moderated to less than 10 mph. Within the guidelines given for prioritizing and executing the photography, the flights were planned to coincide with these atmospheric conditions where possible. All film was processed by Air Photographics. A 9 inch x 9 inch black-and-white contact print was produced for each exposed frame. Each photograph was labeled with the date of acquisition as well as flight line number. Film and photographs were stored under appropriate environmental conditions to prevent degradation.

MAPPING PROCESS

For this analysis, USGS 7.5 minute quadrangle maps were utilized for mapping SAV beds from aerial photography, for digitizing the SAV beds, for mapping ground-truth data, and for compiling SAV bed area measurements. Figure 7 gives locations of 181 quadrangles in the study area which includes all regions with potential for SAV growth. Most quadrangles are sequentially numbered for efficient access to data. The name corresponding to each quadrangle in Figure 7 is listed in Table 2. Identification and delineation of SAV beds by photointerpretation utilized all available information including: knowledge of aquatic grass signatures on film, distribution of SAV in 1995 from aerial photography, 1995 ground-truth information, and aerial site surveys. USGS 7.5 minute quadrangle maps (1:24,000 scale), printed by the Mid-Continent Mapping Center of the National Cartographic Information Center on stable transparent mylar, were used as base maps from which to make copies. Distortion-free, identical copies of these base maps were made at the same scale on stable transparent mylar using a contact print process.

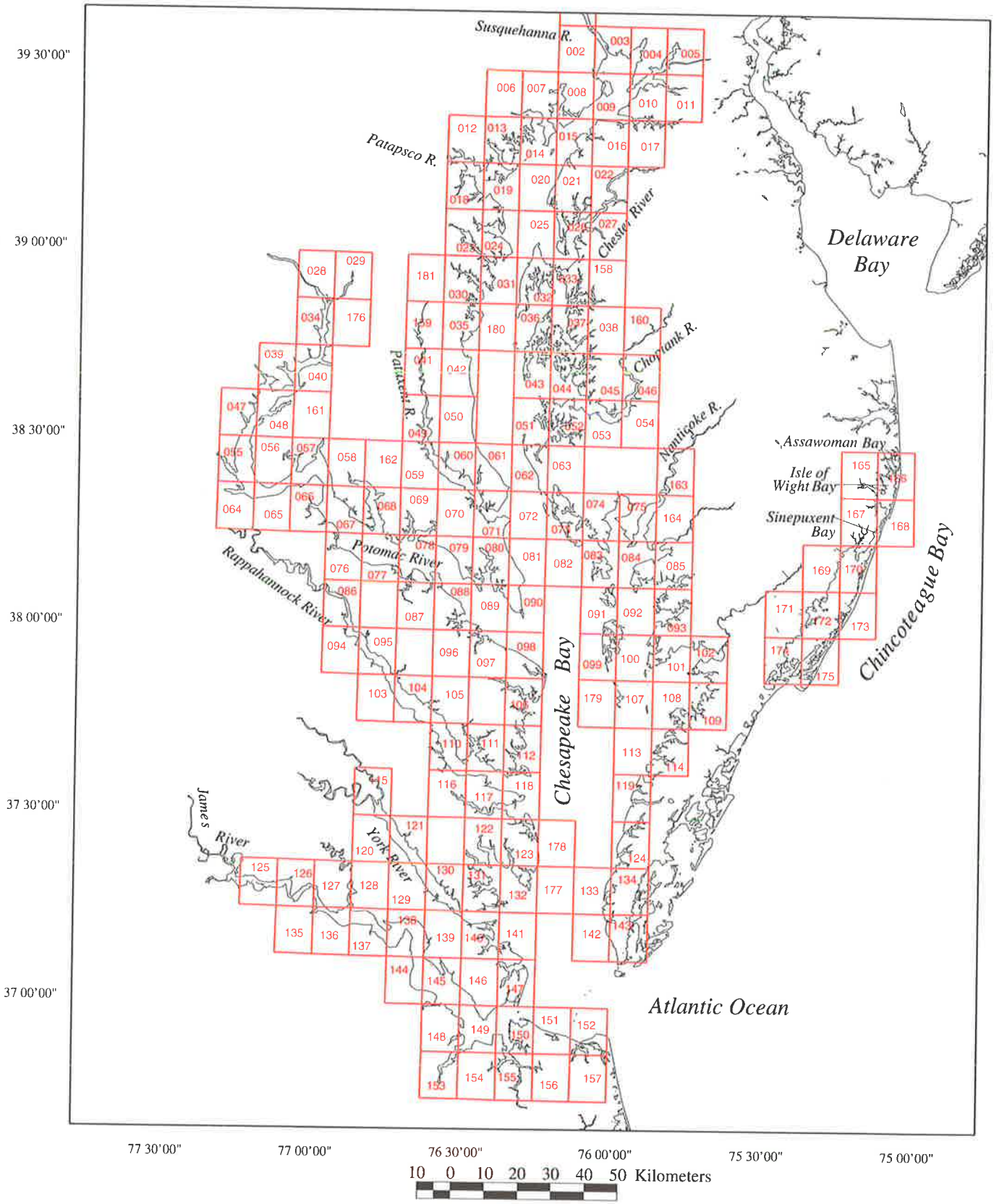

Figure 7: Location of USGS 7.5 minute quadrangles in Chesapeake Bay, its tributaries, and in Chincoteague Bay with corresponding code numbers. (See Table 2 for quad names.)

TABLE 2

List of USGS 7.5 Minute Quadrangles for Chesapeake Bay and Chincoteague Bay SAV Study Areas with Corresponding Code Numbers. (See Figure 7 for Location of Quadrangles. ARC/INFO Generated 7.5 Minute Quadrangles with SAV Beds and Groundtruthing Are Reproduced in Appendix B.)

001. Conowingo Dam, Md.-Pa.
002. Aberdeen, Md.
003. Havre de Grace, Md.
004. North East, Md.
005. Elkton, Md.-Del.
006. White Marsh, Md.
007. Edgewood, Md.
008. Perryman, Md.
009. Spesutie, Md.
010. Earleville, Md.
011. Cecilton, Md.
012. Baltimore East, Md.
013. Middle River, Md.
014. Gunpowder Neck, Md.
015. Hanesville, Md.
016. Betterton, Md.
017. Galena, Md.
018. Curtis Bay, Md.
019. Sparrows Point, Md.
020. Swan Point, Md.
021. Rock Hall, Md.
022. Chestertown, Md.
023. Round Bay, Md.
024. Gibson Island, Md.
025. Love Point, Md.
026. Langford Creek, Md.
027. Centreville, Md.
028. Washington West, Md.-D.C.-Va.
029. Washington East, D.C.-Md.
030. South River, Md.
031. Annapolis, Md.
032. Kent Island, Md.
033. Queenstown, Md.
034. Alexandria, Va.-D.C.-Md.
035. Deale, Md.
036. Claiborne, Md.
037. St. Michaels, Md.
038. Easton, Md.
039. Fort Belvoir, Va.-Md.
040. Mt. Vernon, Md.-Va.
041. Lower Marlboro, Md.
042. North Beach, Md.
043. Tilghman, Md.
044. Oxford, Md.
045. Trappe, Md.
046. Preston, Md.
047. Quantico, Va.-Md.
048. Indian Head, Va.-Md.
049. Benedict, Md.
050. Prince Frederick, Md.
051. Hudson, Md.
052. Church Creek, Md.
053. Cambridge, Md.
054. East New Market, Md.
055. Widewater, Va.-Md.
056. Nanjemoy, Md.
057. Mathias Point, Md.-Va.
058. Popes Creek, Md.
059. Mechanicsville, Md.
060. Broomes Island, Md.
061. Cove Point, Md.
062. Taylors Island, Md.
063. Golden Hill, Md.
064. Passapatanzy, Md.-Va.
065. King George, Va.-Md.
066. Dahlgren, Va.-Md.
067. Colonial Beach North, Md.-Va.
068. Rock Point, Md.

TABLE 2 (continued)

069. Leonardtown, Md.
070. Hollywood, Md.
071. Solomons Island, Md.
072. Barren Island, Md.
073. Honga, Md.
074. Wingate, Md.
075. Nanticoke, Md.
076. Colonial Beach South, Va.-Md.
077. Stratford Hall, Va.-Md.
078. St. Clements Island, Va.-Md.
079. Piney Point, Md.-Va.
080. St. Marys City, Md.
081. Point No Point, Md.
082. Richland Point, Md.
083. Bloodsworth Island, Md.
084. Deal Island, Md.
085. Monie, Md.
086. Champlain, Va.
087. Machodoc, Va.
088. Kinsale, Va.-Md.
089. St. George Island, Va.-Md.
090. Point Lookout, Md.
091. Kedges Straits, Md.
092. Terrapin Sand Point, Md.
093. Marion, Md.
094. Mount Landing, Va.
095. Tappahannock, Va.
096. Lottsburg, Va.
097. Heathsville, Va.-Md.
098. Burgess, Va.-Md.
099. Ewell, Md.-Va.
100. Great Fox Island, Va.-Md.
101. Crisfield, Md.-Va.
102. Saxis, Va.-Md.
103. Dunnsville, Va.
104. Morattico, Va.
105. Lively, Va.
106. Reedville, Va.
107. Tangier Island, Va.
108. Chesconessex, Va.
109. Parksley, Va.
110. Urbanna, Va.
111. Irvington, Va.
112. Fleets Bay, Va.
113. Nandua Creek, Va.
114. Pungoteague, Va.
115. West Point, Va.
116. Saluda, Va.
117. Wilton, Va.
118. Deltaville, Va.
119. Jamesville, Va.
120. Toano, Va.
121. Gressitt, Va.
122. Ware Neck, Va.
123. Mathews, Va.
124. Franktown, Va.
125. Westover, Va.
126. Charles City, Va.
127. Brandon, Va.
128. Norge, Va.
129. Williamsburg, Va.
130. Clay Bank, Va.
131. Achilles, Va.
132. New Point Comfort, Va.
133. Cape Charles, Va.
134. Cheriton, Va.
135. Savedge, Va.
136. Claremont, Va.
137. Surry, Va.
138. Hog Island, Va.
139. Yorktown, Va.
140. Poquoson West, Va.
141. Poquoson East, Va.
142. Elliotts Creek, Va.
143. Townsend, Va.
144. Bacons Castle, Va.
145. Mulberry Island, Va.
146. Newport News North, Va.

TABLE 2 (concluded)

147. Hampton, Va.
148. Benns Church, Va.
149. Newport News South, Va.
150. Norfolk North, Va.
151. Little Creek, Va.
152. Cape Henry, Va.
153. Chuckatuck, Va.
154. Bowers Hill, Va.
155. Norfolk South, Va.
156. Kempsville, Va.
157. Princess Anne, Va.
158. Wye Mills, Md.
159. Bristol, Md.
160. Fowling Creek, Md.
161. Port Tobacco, Md.
162. Charlotte Hall, Md.
163. Mardela Springs, Md.
164. Wetipquin, Md.
165. Selbyville, Md.
166. Assawoman Bay, Md.-Del.
167. Berlin, Md.
168. Ocean City, Md.
169. Public Landing, Md.
170. Tingles Island, Md.
171. Girdle Tree, Md.-Va.
172. Boxiron, Md.-Va.
173. Whittington Point, Md.-Va.
174. Chincoteague West, Va.
175. Chincoteague East, Va.
176. Anacostia, D.C.-Md.
177. East of New Point Comfort, Va.
178. Bethel Beach, Va.
179. Goose Island, Va.
180. Horseshoe Point, Md
181. Bowie, Md.

SAV beds from the 1995 aerial photographs were then mapped onto these mylar copies of USGS 7.5 minute quadrangles. Delineation of each SAV bed was facilitated by superimposing the photographic print with the appropriate mylar quadrangle on a light table. SAV bed boundaries were then traced directly onto the mylar quadrangle with a pencil. Where minor scale differences were evident between a photograph and a quadrangle, or where significant shoreline erosion or accretion had occurred since USGS publication of a map, either a best fit was obtained or shoreline changes were noted on the quadrangle. All photo interpretation of 1995 aerial photography for SAV beds was done by one scientist who also photo interpreted the 1987 to 1994 aerial photographs.

The identification of SAV beds in the Susquehanna Flats area (including Elk, Bohemia, and Sassafras rivers) is done in collaboration with Stan Kollar, who also provides ground-truth data for this region. Delineation of the large bed on the Havre de Grace map is facilitated by both the aerial photography and the ground observations.

In addition to delineating SAV bed boundaries, an estimate of SAV density within each bed was made by visually comparing each bed to an enlarged Crown Density Scale (Figure 8) similar to those developed for estimating forest tree crown cover from aerial photography (Paine, 1981). Bed density was categorized into one of four classes based on a subjective comparison with the density scale. These were: 1, very sparse (<10% coverage); 2, sparse (10-40%); 3, moderate (40-70%); or 4, dense (70-100%). Either the entire bed or subsections within the bed were assigned a bed density number (1 to 4) corresponding to the above density classes. Some beds were subsectioned to delineate where variations in SAV density occurred. Additionally, each distinct SAV unit (bed or bed subsection) was assigned an identifying one or two letter designation unique to its map. Subsections were further identified as contiguous beds by the addition of one or two letters unique to that sequence. These contiguous bed identifications aid the tracking and analysis of single natural bed units that were subsectioned due to variation in SAV density. Coupled with the appropriate SAV map number and year of photography, these one or two letter designations uniquely identify each SAV bed in the database.

SAV PERIMETER DIGITIZATION AND QUALITY ASSURANCE PROCEDURES

The perimeters of all SAV beds mapped from the aerial photography onto the mylar copies were digitized in ARC/INFO, using an Altek Model 41 tablet, with a resolution of .001 inches (.00254 cm) and an accuracy of .005 inches (.0127 cm). The beds for each quadrangle were digitized in a primary ARC/INFO coverage, and, as a quality assurance check, in a secondary ARC/INFO coverage. These coverages were then overlaid digitally. If the area that differed between the two copies was more than 1 hectare and made up more than 2% of the bed or was more than 0.1 hectare and made up more than 10% of the bed, the bed was flagged for additional review. The primary coverage was then plotted at an exact scale of 1:24,000 on translucent plotter paper and overlaid on the original mylar for visual checking of all beds, with additional emphasis on beds flagged by the overlay step. In

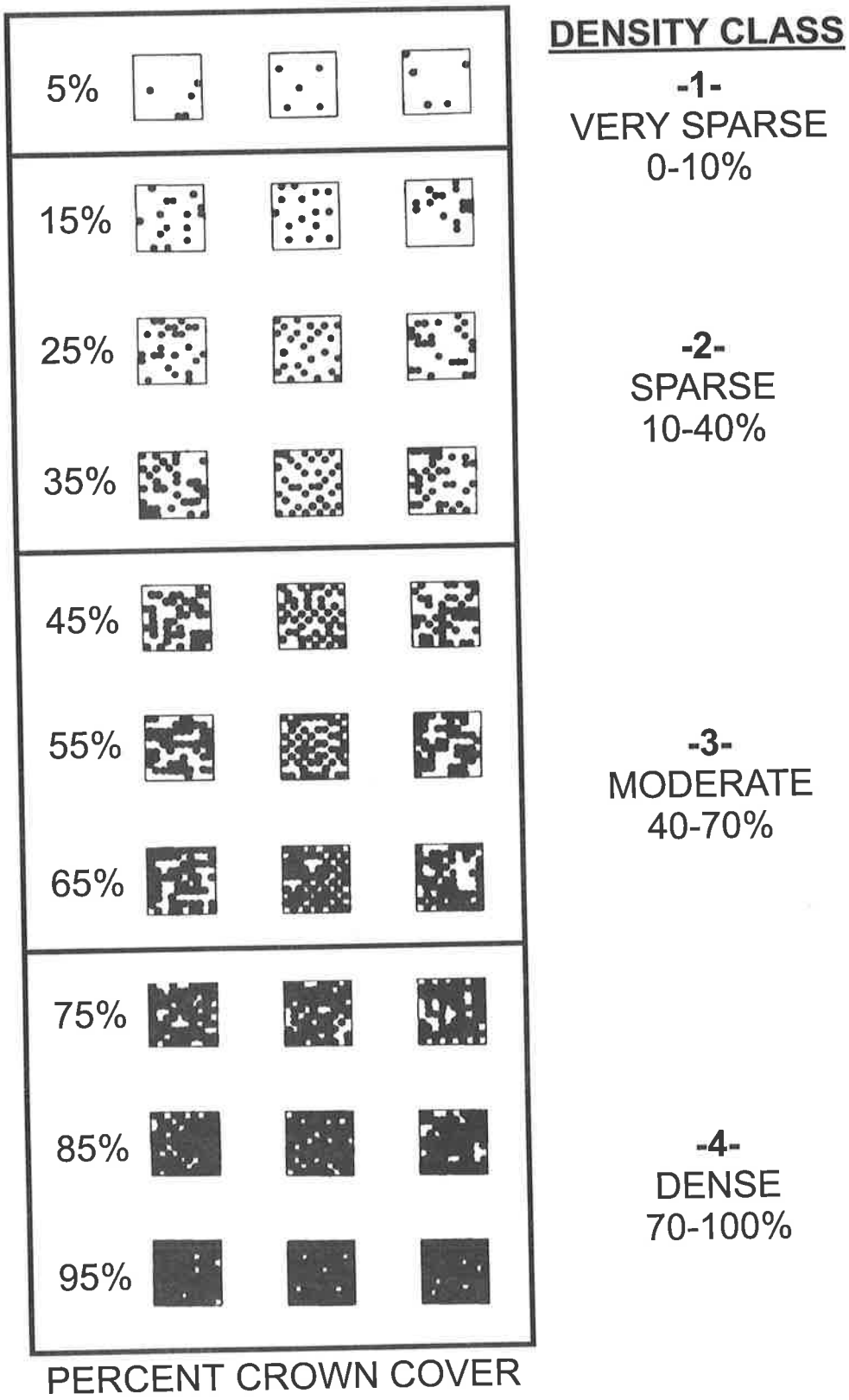

Figure 8. Crown density scale used for estimating density of SAV beds from aerial photography. (Rows of squares with black and white patterns represent three different arrangements of vegetated cover for a given percentage.) *Adapted from Paine, 1981.*

instances where the digitized SAV bed boundaries did not correspond to within 0.5 mm of the original, the bed was re-digitized. The bed-by-bed comparison was useful in identifying registration errors or instances where SAV beds were incorrectly labelled, thus eliminating coding errors.

After all quadrangles were digitized, the resulting digital data was combined to form a single data set for the entire Bay. The quadrangle borders were then scanned (edgematched) to ensure that the SAV polygons were consistent. Inconsistencies were resolved by checking the mylar maps and re-interpreting the photography if necessary. The resulting digital data was added to the VIMS SAV GIS Database containing all previous years data.

Maximum accuracy was maintained by exclusively using mylar quadrangles, which do not change scale as a result of changes in air temperature and humidity in the digitizer room.

Standard operating procedures (SOPs) were developed to facilitate orderly and efficient processing of the 1995 SAV maps and the SAV computer files produced from them, and to comply with the need for consistency, quality assurance, and quality control. SOPs developed include: a detailed procedure for digitization of SAV maps; a digitizer log in which all operations were recorded and dated, which was used to guide and record editing operations; and a flow chart used to track progress of all operations.

CALCULATION OF 1995 SAV AREAS

The SAV coverages in Universal Transverse Mercator (UTM), ARC/INFO, Zone 18 format were used to calculate area in square meters for all SAV beds. These areas are reported as USGS 7.5 minute quadrangle, segment, and zone totals in the tables in the Results section. Segment and zone totals were calculated by using an overlay operation of the segment and zone regions on the SAV beds in ARC/INFO. The definition of the segments used in this analysis are provided in Table 3.

ORGANIZATIONAL PROCEDURES FOR ANALYSIS AND DISCUSSION

SAV distribution data are presented and discussed based on different segmentation and zonation schemes from those used in the SAV distribution and abundance reports prior to 1994. The segmentation scheme used in this report was that adopted by the Chesapeake Bay Program (Flemer *et al.*, 1983) (Tables 3 and 4; Figure 9). The Upper, Middle, and Lower zonation scheme used in the previous reports, as established by Orth and Moore (1982) and modified by Orth *et al.*, (1989) was adapted to the new segmentation scheme. It was followed as closely as possible but, necessarily, had to be modified to accommodate the new segment boundaries (Figure 9). Data are presented for the years 1978-1995, where available, using the Chesapeake Bay Program segmentation scheme.

TABLE 3

Chesapeake Bay Program Segment Descriptions

Northern Chesapeake Bay (CB1): head of Bay segment, excluding the Northeast River but including Swan Creek. CB1 adjoins CB2 at a boundary that extends from Sandy Point of Spesutie Island, on the west, to Turkey Point of Elk Neck, on the east, and that lies in the region of maximum penetration of sea salts at the head of the Bay.

Northeast; Elk and Bohemia; and Sassafras rivers (ET1; ET2; ET3): upper eastern shore tributary segments adjoining mainstem Bay segments at their respective mouths. The northernmost tributary, ET1, flows into CB1 east of Furnace Bay. The Bohemia River joins the Elk River and together comprise ET2 which flows into CB2 at Turkey Point. ET3 flows into CB2 further south at Grove Point.

Upper Chesapeake Bay and Upper Central Chesapeake Bay (CB2; CB3): upper main stem Bay segments, excluding main tributaries. CB2 includes Romney and Still Pond creeks. The boundary of CB2 with CB3 extends from Robins Point on Gunpowder Neck, through Pooles Island, to south of Fairlee Creek. This boundary demarcates the southern limit of the turbidity maximum and also coincides with the long-term summer average for the 5 ppt salinity contour. CB3 includes Tavern and Swan creeks and the Haven, all east of Swan Point. The boundary of CB3 with CB4 extends from Sandy Point, south of the Magothy River on the east, to Kent Island, below Love Point, and marks both the northern limit of deep water anoxia in Chesapeake Bay and the 10 ppt salinity contour.

Bush; Gunpowder; Middle; Back; and Patapsco rivers (WT1; WT2; WT3; WT4; WT5): upper western shore tributaries segments adjoining mainstem Bay segments at their respective mouths. WT1 adjoins southwestern CB2 south of Abbey Point. WT2 includes Saltpeter and Dundee creeks and adjoins northwestern CB3 at Weir Point. WT3, WT4, and WT5 adjoin middle-western CB3. WT3 includes Seneca Creek which is connected to Saltpeter Creek. WT4 adjoins CB3 at a boundary extending from Cedar Point on the north shore to Swan Point on the south shore and does not include Hawk Cove, west of Hart Island. WT5 adjoins CB3 at the boundary extending from North Point on the north shore, to a point approximately midway between Cedar and Bodkin points on Bodkin Neck on the south shore, and includes Bodkin Creek.

Chester River (ET4): eastern shore tributary segment. ET4 adjoins southeastern CB3 at a boundary extending across the mouth from Kent Island, below Love Point, to Wickes Beach on the western side of Eastern Neck Island.

(continue on next page)

TABLE 3 (continued)

Magothy; Severn; South, Rhode, and West rivers (WT6; WT7; WT8): upper western shore tributary segments adjoining mainstem Bay segments at their respective mouths. WT6 adjoins southwestern CB3 near the boundary with CB4. WT7 includes Lake Ogleton and adjoins northwestern CB4 at a boundary extending from Greenbury Point on the north shore, to Tolly Point on the south shore. WT8 adjoins northwestern CB4 at a boundary extending from Marshy Point on the north shore of the mouth of the South River, to Felicity Cove on the south shore of the mouth of the West River.

Eastern Bay (EE1): eastern shore embayment segment, including Prospect Bay, and the Wye and Miles rivers. The boundary with CB4 extends from Kent Point, through Coaches Island, to Tilghman Island.

Middle Central Chesapeake Bay (CB4): main stem Bay segment, including Whitehall and Herring bays. CB4 extends in the North from Whitehall Bay, western shore, to Kent Island, eastern shore, and in the south from Cove Point, western shore, to Cattail Island, eastern shore. CB4 excludes major tributaries and embayments such as EEI and EE2, the Lower Choptank, which adjoin it on the east, and WT7 and WT8 which adjoin it on the west.

Lower Choptank River; Choptank River (EE2; ET5): eastern shore embayment segment and adjoining tributary segment. EE2 adjoins mainstem Bay segment CB4 at a boundary extending south from Tilghman Island, through James Island, to Oyster Cove at the north end of Taylor Island. EE2 includes Harris, Broad, and Islands creeks, and the Tred Avon River in the north, and Brannock Bay, Slaughter Creek, and the Little Choptank River in the south. The EE2 boundary with ET5 extends across the Choptank River from Castle Haven Point to Chlora Point.

Lower Patuxent River; Middle Patuxent River; and Upper Patuxent River (LE1; RET1; TF1): segments comprising major western shore tributary. LE1, the lower sub-estuary portion, adjoins mainstem Bay segment CB5 at a boundary at the mouth extending from Fishing Point on the south shore, to Drum Point on the north shore. Upstream, RET1, the river-estuarine-transition portion, adjoins LE1 at the turbidity maximum, the boundary extending approximately from Trent Hall Point on the west shore to Sheridan Point on the east shore. Further upstream, TF1, the tidal-fresh portion, adjoins RET1 at a boundary extending approximately from Chalk Point on the west shore to Gods Grace Point on the east shore.

(continue on next page)

TABLE 3 (continued)

Nanticoke; Wicomico; Manokin; Big Annemessex; and Pocomoke rivers (ET6; ET7; ET8; ET9; ET10): eastern shore tributary segments adjoining Tangier Sound (EE3) at their respective mouths. The boundary of ET6 with EE3 extends from Sandy Island on the west shore, to Stump Point Marsh on the east shore. ET7 includes Ellis and Monie bays, and its boundary with EE3 extends from Stump Point Marsh to Long Point on the south shore. ET8 includes Laws Thorofare, and Fishing, Broad, Geanquakin, and St. Peters creeks, on the north shore, and Back, Wolftrap, Broad, Teague, and Mine creeks, on the south shore, and its boundary with EE3 extends from Claw Point on Little Deal Island in the north, to Hazard Point on Hazard Island in the south. ET9 includes Mine, Shirtpond, Flatland, Fords, and Crane coves, and Moon Bay, on the north shore, and Gales, Colbourn, Jones, Dougherty, and Acre creeks, and Joes Cove, on the south shore, and its boundary with EE3 extends from Pat Island on the north shore, to Flatcap Point on Janes Island on the south shore. ET10 includes a small part of eastern Pocomoke Sound, and its boundary with EE3 extends from Pig Point, at the eastern end of Robin Hood Bay on the south shore, to a point directly north on Marumsco Marsh, west, of Fair Island on the north shore.

Tangier Sound (EE3): generally, the area east of Bloodsworth, South Marsh, Smith, and Tangier islands, extending in the north from the head of the Honga River and Fishing Bay, south to Watt's Island and Big Marsh on the eastern shore. EE3 includes the Honga River; Fishing Bay; the Little Annemessex River; the Great Fox Islands; most of Pocomoke Sound; Messongo Creek; Beasley Bay; Halfmoon, Webb, and Savage islands; the northern parts of Big Marsh and Watt's Island; the eastern parts of Tangier, Smith, and South Marsh islands; most of Bloodsworth Island except for the western extremities; and the eastern shores of the Hooper Islands, Gunners Island, and Meekins Neck which form the western bank of the Honga River. EE3 adjoins CB5 at a boundary which extends in the north from Meekins Neck, south through, and roughly bisecting, a series of islands forming the western edge of the Tangier Sound. Specifically, the boundary of EE3 with CB5 extends from Meekins Neck, south through Gunners Island and the Hooper Islands, to Creek Point on Little Hooper Island, southeast to Okahanikan Cove on northern Bloodsworth Island, to Northeast Cove on southwest Bloodsworth Island, southeast to Johnson Cove on northern South Marsh Island, to Sheepshead Harbor on southern South Marsh Island, southeast to the northern tip of Smith Island, to the mouth of Tyler Creek on the southeastern end of Smith Island, directly south to Thorofare Island, and then Goose Island, south to the northern tip of Tangier Island, south to Mailboat Harbor on the southeast end of Tangier Island, east to the middle of Watt's Island and to the western most tip of Big Marsh.

(continue on next page)

TABLE 3 (continued)

Lower Potomac River; Middle Potomac River; and Upper Potomac River (LE2; RET2; TF2): middle western shore tributary segments. The lower sub-estuary, LE2, includes the St. Marys and Wicomico rivers, and Breton and St. Clements bays, on the north shore, and on the south shore, the Coan and Yeocomico rivers, the Lower Machodoc, Nomini, Popes, Mattox, and Upper Machodoc creeks, and Currioman Bay. LE2 adjoins CB5, the main stem Bay, at the river mouth at a boundary extending from Point Lookout on the north shore, to Ginny Beach on the south shore. The river-estuarine-transition zone, RET2, includes the Port Tobacco River and Nanjemoy Creek on the north shore, and Aquia and Potomac creeks on the south shore. RET2 adjoins LE2, at a boundary extending from just above Lower Cedar Point on the north shore, to the mouth of Gambo Creek on the south shore. The tidal fresh zone, TF2, includes Mattawoman, Piscataway, and Broad creeks, and the Anacostia River on the east shore, and, on the west shore, Chopawamsic, Quantico, Powells, Neabsco, and Dogue creeks, Occoquan Bay, and Gunston Cove. TF2 adjoins RET2 at a boundary extending from Quantico on the west shore, to Moss Point on the east shore.

Lower Central Chesapeake Bay (CB5): a mid-mainstem segment extending in the north from Cove point, on the western shore, across the Bay to Cattail Island, and south to Windmill Point on the western shore, then northeast to the southern end of Tangier Island. CB5 includes Jerome Creek, above the mouth of the Potomac River, and below the mouth, the Wicomico and Great Wicomico rivers, and Fleets Bay. CB5 adjoins CB4 in the north, CB6 and CB7 in the south, LE1 and LE2 on the west, and EE3 on the east.

Lower Rappahannock River; Middle Rappahannock River; Upper Rappahannock River (LE3; RET3; TF3): lower western shore tributary segments, also including the Piankatank River entering the Bay immediately below the mouth of the Rappahannock River. The lower sub-estuary, LE3, adjoins the mainstem Bay at a boundary at the mouth extending from Fleets Island in the north, to Gwynn Island at the southern edge of the mouth of the Piankatank River. LE3 includes both the entire Piankatank and Corrotoman rivers, the latter a tributary of the Rappahannock. The river-estuarine-transition zone, RET3, adjoins LE3 at a boundary extending on the north shore from Morattico, to McKans Bay on the south shore. The tidal fresh zone, TF3, adjoins RET3 at a boundary extending from Mulberry Point on the north shore, to Jenkins Landing on the south shore.

Western Lower Chesapeake Bay (CB6): a lower mainstem segment whose eastern boundary bisects the lower Bay and adjoins CB7. The western boundary extends in the North from Windmill Point, at the north shore of the mouth of the Rappahannock River, across the

(continue on next page)

TABLE 3 (continued)

Western Lower Chesapeake Bay (CB6) (continued): mouths of Mobjack Bay and the York, Poquoson, and Back rivers (segment WE4), to Northend Point at the south shore of the mouth of the Back River. The northern boundary adjoins CB5. The southern boundary adjoins CB8. CB6 includes Milford Haven, Winter Harbor, and Horn Harbor.

Eastern Lower Chesapeake Bay (CB7): a lower mainstem segment whose western boundary bisects the lower Bay and adjoins CB6. The eastern boundary extends in the north from Big Marsh, south to the middle of the mouth of the Bay. The northern boundary adjoins EE3. The southern boundary adjoins CB8. CB7 includes several tributary creeks and Cherrystone Inlet.

Mobjack Bay (WE4): western shore embayment segment. WE4 adjoins southeastern CB6 at a boundary extending in the north from New Point Comfort, to Northend Point, on the south shore of the mouth of the Back River. WE4 includes the East, North, Ware, Severn, Poquoson, and Back rivers, the Guinea Marshes, Goodwin Island, and the mouth of the York River, to a boundary line extending from approximately west of Allens Island, on the north shore, to west of Thorofare by Goodwin Island, on the south shore.

Lower York River; Middle York River; Upper York River (LE4; RET4; TF4): lower western shore tributary segments. The lower sub-estuary, LE4, adjoins WE4 at a boundary extending from approximately west of Allens Island, on the north shore, to west of Thorofare by Goodwin Island, on the south shore. The river-estuarine-transition zone, RET4, adjoins LE4 at a boundary extending from Purtan Island, on the north shore, to a point on the south shore just below Taskinas Creek. The tidal fresh zone, TF4, adjoins RET4 at points just upstream of the mouths of the Mattaponi and Pamunkey rivers, two tributaries that join to form the York River.

Lower James River; Middle James River; Upper James River (LE5; RET5; TF5): western shore tributary segments comprising the southernmost major river entering the Bay. The sub-estuary, LE5, adjoins the mainstem Bay at the mouth, at a boundary extending from Old Point Comfort, on the north shore, to Willoughby Bay on the south shore. LE5 includes the Elizabeth and Nanesmond rivers. The river-estuarine-transition zone, RET5, adjoins LE5 at a boundary extending from approximately east of Jamestown Island, on the north shore, to Chippokes Plantation State Park, on the south shore. RET5 includes the Chickahominy River. The tidal fresh zone, TF5, adjoins RET5, at a boundary extending from approximately west of Sunken Meadow Creek on the south shore, to an unnamed point on the north shore directly across the river.

(continue on next page)

TABLE 3 (concluded)

Mouth of the Chesapeake Bay (CB8): the southernmost mainstem segment, including Broad and Lynnhaven bays and Little Creek. CB8 adjoins the Atlantic Ocean at the mouth of the Bay at a boundary extending from Cape Henry, on the south shore, to a point approximately midway across the mouth, at the boundary with CB7. CB8 adjoins CB6 and CB7 in the north, and LE5 in the west.

TABLE 4

Chesapeake Bay Program Segments with Salinity Regime (adapted from Orth *et al.*, 1995)

Segment	Name	Salinity Regime
CB1	Northern Chesapeake Bay	Tidal Fresh
CB2	Upper Chesapeake Bay	Oligohaline
CB3	Upper Central Chesapeake Bay	Mesohaline
CB4	Middle Central Chesapeake Bay	Mesohaline
CB5	Lower Central Chesapeake Bay	Mesohaline
CB6	Western Lower Chesapeake Bay	Polyhaline
CB7	Eastern Lower Chesapeake Bay	Polyhaline
CB8	Mouth of the Chesapeake Bay	Polyhaline
WT1	Bush River	Oligohaline
WT2	Gunpowder River	Oligohaline
WT3	Middle River	Oligohaline
WT4	Back River	Oligohaline
WT5	Patapsco River	Mesohaline
WT6	Magothy River	Mesohaline
WT7	Severn River	Mesohaline
WT8	South, Rhode & West Rivers	Mesohaline
TF1	Upper Patuxent River	Oligohaline
RET1	Middle Patuxent River	Mesohaline
LE1	Lower Patuxent River	Mesohaline
TF2	Upper Potomac River	Tidal Fresh
RET2	Middle Potomac River	Oligohaline
LE2	Lower Potomac River	Mesohaline
TF3	Upper Rappahannock River	Oligohaline
RET3	Middle Rappahannock River	Mesohaline
LE3	Lower Rappahannock River	Mesohaline
TF4	Upper York River	Oligohaline
RET4	Middle York River	Mesohaline
LE4	Lower York River	Polyhaline
WE4	Mobjack Bay	Polyhaline
TF5	Upper James River	Tidal Fresh
RET5	Middle James River	Oligohaline
LE5	Lower James River	Mesohaline
ET1	Northeast River	Oligohaline
ET2	Elk & Bohemia Rivers	Oligohaline

SAV

TABLE 4 (concluded)

Segment	Name	Salinity Regime
ET3	Sassafras River	Oligohaline
ET4	Chester River	Mesohaline
ET5	Choptank River	Mesohaline
ET6	Nanticoke River	Mesohaline
ET7	Wicomico River	Mesohaline
ET8	Manokin River	Mesohaline
ET9	Big Annemessex River	Mesohaline
ET10	Pocomoke River	Mesohaline
EE1	Eastern Bay	Mesohaline
EE2	Lower Choptank River	Mesohaline
EE3	Tangier Sound	Mesohaline

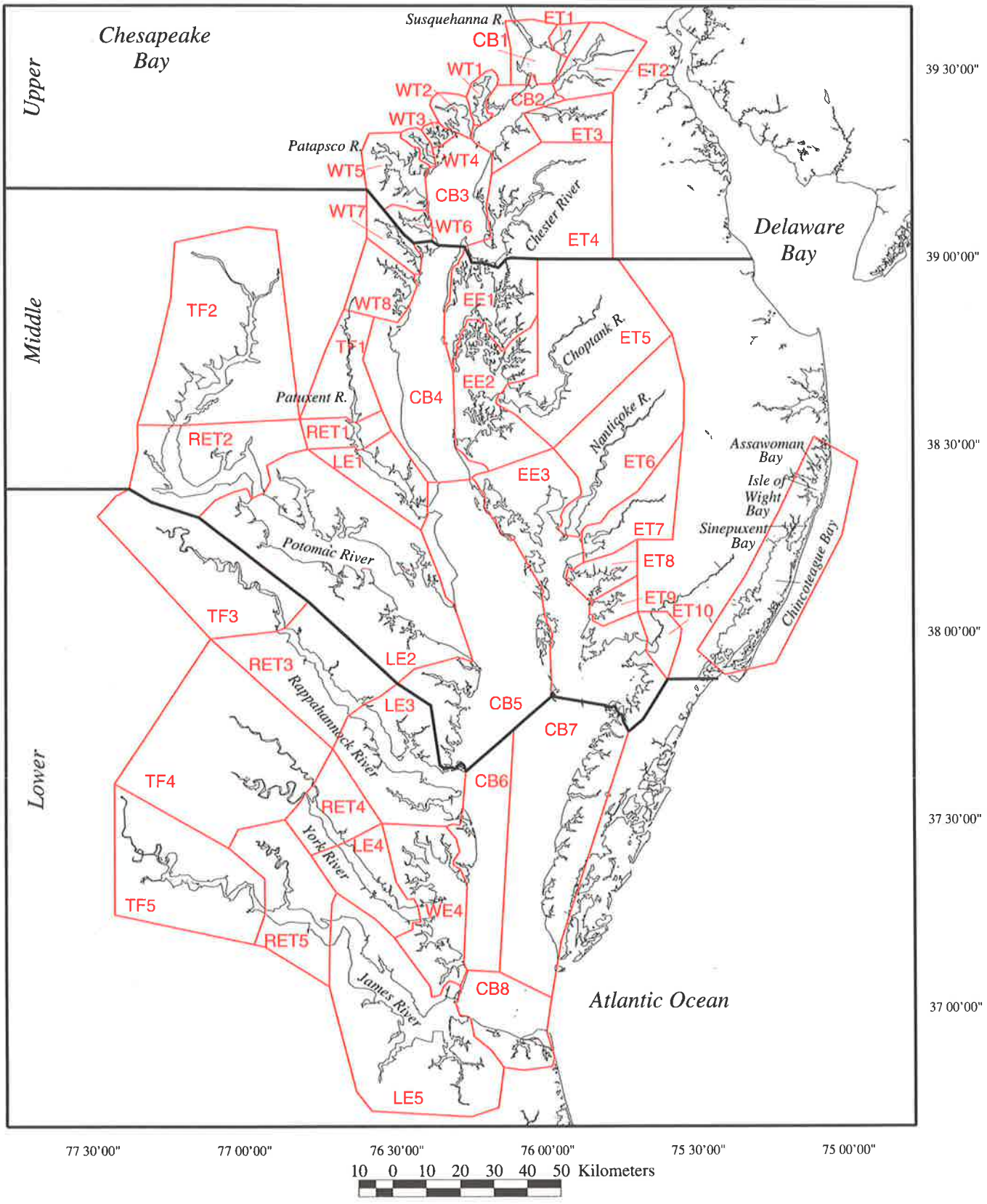

Figure 9: Location of Chincoteague Bay and Chesapeake Bay with Upper, Middle, and Lower zones and the 44 Chesapeake Bay Program segments.

The area between the Chesapeake Bay Bridge and the Susquehanna Flats is referred to as the Upper Bay zone. The salinity within each zone roughly coincides with the major salinity zones of estuaries: polyhaline (18-25 °/oo), Lower zone; mesohaline (5-18 °/oo), Middle zone; oligohaline (0.5-5 °/oo), Upper zone. Although the major rivers and smaller tributaries of Chesapeake Bay have their own salinity regimes, the distribution of SAV in each river is discussed within the zone where it connects to the Bay. SAV distribution in Chincoteague Bay is presented and discussed separately from Chesapeake Bay. The Chincoteague Bay segment, for the purpose of discussion in the figures and tables, includes four barrier island bays: Chincoteague, Assawoman, Sinepuxent, and Isle of Wight.

GROUND SURVEYS AND OTHER DATABASES

Ground surveys were accomplished by cooperative efforts from a number of agencies and individuals. Although not all areas of the Bay were surveyed, the data did provide valuable supplemental information. The surveys confirmed the existence of some SAV beds mapped from the 1995 aerial photography, as well as SAV beds not visible from the photography because they were too small at 1:24,000 scale. The surveys also provided species data for many of the SAV beds. Ground survey information supplied to VIMS researchers was included on the SAV distribution and abundance digital maps reproduced in Appendix B and included in the VIMS SAV GIS Database. Each survey was designated by a unique symbol to identify the different methods of sampling. In most cases the symbols on the SAV maps (Appendix B) were enlarged and offset from the actual sampling point to avoid confusion with the mapped SAV bed. Where species information was available, it was included on the map. Because of space limitations on the maps reproduced in Appendix B, occasionally one or more survey points were combined where the information was duplicated. All ground survey data supplied to VIMS are tabulated in Appendix D.

In Maryland, ground survey data were obtained in 1995 by VIMS, Stan Kollar of Harford Community College, the USGS National Center, Peter Bergstrom of the USFWS, Kent Mountford of the USEPA, Patuxent River Park staff, Dr. William Hilgartner of The John Hopkins University, and by the Citizens' volunteer survey. The USGS National Center provided ground survey data for the Potomac River. Peter Bergstrom provided extensive ground survey data for the Magothy River. Kent Mountford provided species data for St. Leonard Creek. Patuxent River ground survey data were obtained by the Maryland-National Capital Parks and Planning Commission Patuxent River Park staff. The Citizens' volunteer survey, including the Ocean Pines Boat Club of Berlin, Maryland, and John Flood, under the guidance of the USFWS and the Chesapeake Bay Foundation (CBF), identified SAV locations and SAV species when possible throughout various areas of the Chesapeake and Chincoteague bays. The National Park Service also provided groundtruthing for Chincoteague Bay. Volunteers, who were recruited through press releases, newsletters, and personal letters, were provided with a SAV identification guide, reduced 1993 SAV maps to aid in the location of SAV beds, and data sheets for reporting visits to numerous sites around the bays. USFWS staff mapped the data on copies of 1993 SAV distribution maps (USGS 7.5 minute quadrangles with 1993 SAV beds). These maps were supplied to VIMS SAV researchers and transferred to the 1995 SAV

distribution maps reproduced in Appendix B. Data from the Patuxent River Park staff, and the Citizens' surveys were compiled and tabulated by USFWS. This table became the basis of the much expanded table published in Appendix D.

One 1995 SAV research project being conducted on the Susquehanna Flats by Stan Kollar of Harford Community College, Maryland, also provided data in the form of species presence by estimated percent cover, although these percentages are not reported here.

Dr. William Hilgartner of The Johns Hopkins University reported SAV species from Otter Point Creek in the Bush River as part of a research project being conducted there.

For those areas in Virginia waters where aerial photographic evidence of SAV beds was inconclusive, photo verification was accomplished by ground-truth surveys. Observations were principally made from small boats and by divers snorkeling over areas indicated from the photographs. In the York, Piankatank, and Rappahannock rivers, where VIMS researchers transplanted SAV (principally eelgrass), transplant sites were also examined carefully by divers for any extant SAV. VIMS scientists also surveyed a number of sites in the Chesapeake Bay as part of an intensive quantitative SAV-blue crab study (VIMS, unpublished data). Data for Virginia waters were also collected by the Citizens' volunteer survey (compiled by the USFWS). In addition, a great deal of ground survey information could be extrapolated from earlier studies (Orth *et al.*, 1979; Orth and Moore, 1982). SAV beds in the lower Bay contained primarily one or two species and most areas underwent wide fluctuations in distribution and abundance since the first bay-wide survey in 1978.

Ground survey data from all sources reported here are presented in Appendix D.

RESULTS

DATA PRESENTATION

SAV distribution data in this report are presented and discussed based on the Chesapeake Bay Program (CBP) segmentation scheme described briefly in the Methods section (Tables 3 and 4; Figure 9; Flemer *et al.,* 1983). Data are also grouped and discussed according to Upper, Middle, and Lower Chesapeake Bay zones, and the Chincoteague Bay section (Figure 9; Orth *et al.,* 1995). The Chincoteague Bay section refers to a composite of four Atlantic coast, barrier island bays of the Delmarva peninsula: Chincoteague, Sinepuxent, Assawoman, and Isle of Wight bays.

The 1995 SAV bed data were edgematched using ARC/INFO GIS software, as were all the historical SAV bed data, in order to bring separately digitized USGS 7.5 minute topographic quadrangle SAV coverages into one unified coverage for the entire Chesapeake Bay (see Methods; VIMS SAV GIS Database; Orth *et al.,* 1995). Therefore, SAV distribution data presented in this report reflect edgematching adjustments, and may differ from previously published data for these years derived from separate coverages which were not edgematched (i.e., Orth.*et al.,* 1992, 1993, and 1994).

SAV distribution data for 1995 and 1994 are presented in hectares: by quadrangle (Table 5); by Chesapeake Bay zones and by Chincoteague Bay section (Figure 2); by CBP segment and by zone (Figures 3, 4, and 5; Table 6); by USGS 7.5 minute quadrangles for each CBP segment and for the Chincoteague Bay section (Table 7); by CBP segment and the Chincoteague Bay section (also given in acres) (Table 7). Distribution data for 1995 and 1994 by SAV density class are presented in hectares for each CBP segment (Figures 3, 4, and 5; Table 8) and for the Chincoteague Bay section (Table 8). Distribution data for 1995 and 1994 by density class are presented by hectares for the zones of Chesapeake Bay and for the Chincoteague Bay section (Table 9). Quadrangle maps annotated with all 1995 SAV beds, and with 1995 ground-truth data, are presented in Appendix B, whereas all ground-truth data for 1995 are also tabulated in Appendix D. The calculated areas for individual SAV beds for each quadrangle are given in square meters in Appendix C.

The 1995 SAV data are summarized and compared with 1994 data and are discussed relative to the Upper, Middle, and Lower Bay zones. The forty-five Chesapeake Bay segments, and the Chincoteague Bay section, are then discussed either individually or as combined groups, and 1995 data are compared with data from 1994 and other pertinent years. The 1995 distribution of SAV is plotted on maps of each Chesapeake Bay Program segment, and of the Chincoteague Bay section; and distribution data for 1978-1995 are graphed by segment, by year, and by density in insets within these figures. Segments ET6, ET7, ET10, TF4, RET4, TF3, RET3, and WT4 are not graphed because there were no data or no SAV beds mapped for them from 1978-1995 (VIMS SAV GIS Database). In these CBP segment plots, SAV beds are plotted in red; segment boundaries are represented by bold, black lines; and USGS 7.5 minute quadrangles are represented by a grid of numbered rectangles (refer to Table 2 for quadrangle names listed by VIMS map number). Specific

TABLE 5

Total Area of SAV in Hectares by USGS 7.5 Minute Quadrangles for 1994 and 1995.

Quadrangle	1994	1995
001. Conowingo Dam, Md.-Pa.	0	0
002. Aberdeen, Md.	11.66	12.13
003. Havre de Grace, Md.	2,272.49	1,865.52
004. North East, Md.	133.38	40.84
005. Elkton, Md.-Del.	0	37.11
006. White Marsh, Md.	0	0
007. Edgewood, Md.	7.03	21.62
008. Perryman, Md.	2.05	6.10
009. Spesutie, Md.	397.21	208.44
010. Earleville, Md.	96.76	124.31
011. Cecilton, Md.	0	0
012. Baltimore East, Md.	0	0
013. Middle River, Md.	9.55	2.39
014. Gunpowder Neck, Md.	97.69	49.00
015. Hanesville, Md.	2.08	3.60
016. Betterton, Md.	52.92	85.73
017. Galena, Md.	10.47	45.66
018. Curtis Bay, Md.	0.37	#
019. Sparrows Point, Md.	#	#
020. Swan Point, Md.	14.70	19.62
021. Rock Hall, Md.	38.99	42.70
022. Chestertown, Md.	0	0
023. Round Bay, Md.	31.99	53.65
024. Gibson Island, Md.	17.88	28.99
025. Love Point, Md.	0	0
026. Langford Creek, Md.	565.09	570.69
027. Centreville, Md.	0	0
028. Washington West, Md.- D.C.- Va	24.60	39.70
029. Washington East, D.C.- Md.	0.66	0.99
030. South River, Md.	1.69	1.83
031. Annapolis, Md.	#	#
032. Kent Island, Md.	256.80	536.61

(continued on next page)

TABLE 5 (continued)

Quadrangle	1994	1995
033. Queenstown, Md.	272.97	354.35
034. Alexandria, Va.- D.C.- Md.	284.63	277.80
035. Deale, Md.	4.68	#
036. Claiborne, Md.	562.24	538.10
037. St. Michaels, Md.	433.80	446.43
038. Easton, Md.	0	6.24
039. Fort Belvoir, Va.- Md.	144.36	115.37
040. Mt. Vernon, Md.- Va.	122.48	111.84
041. Lower Marlboro, Md.	51.61	54.02
042. North Beach, Md.	0	0
043. Tilghman, Md.	336.84	289.63
044. Oxford, Md.	330.72	321.71
045. Trappe, Md.	7.04	12.74
046. Preston, Md.	0	0
047. Quantico, Va.- Md.	387.81	277.22
048. Indian Head, Va.- Md.	254.62	38.35
049. Benedict, Md.	1.52	#
050. Prince Frederick, Md.	0	-
051. Hudson, Md.	282.71	409.69
052. Church Creek, Md.	75.67	78.59
053. Cambridge, Md.	0	0
054. East New Market, Md.	0	0
055. Widewater, Va.- Md.	540.33	246.08
056. Nanjemoy, Md.	91.78	106.20
057. Mathias Point, Md.- Va.	253.19	244.02
058. Popes Creek, Md.	1.66	2.40
059. Mechanicsville, Md.	0	0
060. Broomes Island, Md.	#	#
061. Cove Point, Md.	#	#
062. Taylors Island, Md.	53.78	8.11
063. Golden Hill, Md.	57.77	34.78
064. Passapatanzy, Md.- Va.	62.36	121.26
065. King George, Va.- Md.	80.59	85.96
066. Dahlgren, Va.- Md.	31.20	41.47
067. Colonial Beach North, Md.- Va.	99.78	125.20

(continued on next page)

TABLE 5 (continued)

Quadrangle	1994	1995
068. Rock Point, Md.	36.79	12.84
069. Leonardtown, Md.	0	18.57
070. Hollywood, Md.	#	#
071. Solomons Island, Md.	#	#
072. Barren Island, Md.	0	0
073. Honga, Md.	797.99	410.06
074. Wingate, Md.	503.47	407.63
075. Nanticoke, Md.	0	0
076. Colonial Beach South, Va.- Md.	#	#
077. Stratford Hall, Va.- Md.	7.69	9.31
078. St. Clements Island, Va.- Md.	#	19.11
079. Piney Point, Md.- Va.	0	0
080. St. Marys City, Md.	0	2.89
081. Point No Point, Md.	-	-
082. Richland Point, Md.	14.67	0
083. Bloodsworth Island, Md.	555.64	443.90
084. Deal Island, Md.	15.02	30.34
085. Monie, Md.	5.58	4.21
086. Champlain, Va.	0	-
087. Machodoc, Va.	0	0
088. Kinsale, Va.- Md.	0	0
089. St. George Island, Va.- Md.	0	0
090. Point Lookout, Md.	0	0
091. Kedges Straits, Md.	632.43	486.23
092. Terrapin Sand Point, Md.	173.01	183.09
093. Marion, Md.	236.13	262.49
094. Mount Landing, Va.	-	-
095. Tappahannock, Va.	-	-
096. Lottsburg, Va.	-	0
097. Heathsville, Va.- Md.	-	0
098. Burgess, Va.- Md.	-	0
099. Ewell, Md.- Va.	1,705.35	1,596.77
100. Great Fox Island, Va.- Md.	1,145.88	1,160.80
101. Crisfield, Md.- Va.	179.13	179.82
102. Saxis, Va.- Md.	0	2.53

(continued on next page)

TABLE 5 (continued)

Quadrangle	1994	1995
103. Dunnsville, Va.	-	-
104. Morattico, Va.	-	0
105. Lively, Va.	-	0
106. Reedville, Va.	258.77	250.12
107. Tangier Island, Va.	485.79	464.16
108. Chesconessex, Va.	1,037.15	992.68
109. Parksley, Va.	407.32	390.29
110. Urbanna, Va.	0	0
111. Irvington, Va.	57.74	11.73
112. Fleets Bay, Va.	497.97	452.66
113. Nandua Creek, Va.	440.03	337.09
114. Pungoteague, Va.	879.73	819.50
115. West Point, Va.	-	-
116. Saluda, Va.	0	-
117. Wilton, Va.	2.44	0
118. Deltaville, Va.	170.05	120.48
119. Jamesville, Va.	553.76	526.23
120. Toano, Va.	-	-
121. Gressitt, Va.	-	#
122. Ware Neck, Va.	283.95	291.20
123. Mathews, Va.	217.49	140.32
124. Franktown, Va.	605.08	584.56
125. Westover, Va.	0	0
126. Charles City, Va.	0	0
127. Brandon, Va.	0	0
128. Norge, Va.	-	-
129. Williamsburg, Va.	-	-
130. Clay Bank, Va.	0	0
131. Achilles, Va.	1,096.16	1,099.30
132. New Point Comfort, Va.	1,529.07	1,529.20
133. Cape Charles, Va.	482.29	352.72
134. Cheriton, Va.	92.24	85.08
135. Savedge, Va.	-	-
136. Claremont, Va.	-	-
137. Surry, Va.	-	-

(continued on next page)

TABLE 5 (continued)

Quadrangle	1994	1995
138. Hog Island, Va.	-	-
139. Yorktown, Va.	4.47	4.59
140. Poquoson West, Va.	581.03	583.88
141. Poquoson East, Va.	1,154.29	1,156.63
142. Elliotts Creek, Va.	161.08	102.99
143. Townsend, Va.	0	0
144. Bacons Castle, Va.	-	-
145. Mulberry Island, Va.	-	-
146. Newport News North, Va.	0	0
147. Hampton, Va.	346.48	350.17
148. Benns Church, Va.	0	0
149. Newport News South, Va.	0	0
150. Norfolk North, Va.	0	0
151. Little Creek, Va.	0	4.00
152. Cape Henry, Va.	40.15	12.99
153. Chuckatuck, Va.	0	0
154. Bowers Hill, Va.	0	0
155. Norfolk South, Va.	0	0
156. Kempsville, Va.	0	0
157. Princess Anne, Va.	2.50	0
158. Wye Mills, Md.	0	0
159. Bristol, Md.	23.59	21.11
160. Fowling Creek, Md.	0	0
161. Port Tobacco, Md.	0	0
162. Charlotte Hall, Md.	7.49	9.17
163. Mardela Springs, Md.	0	0
164. Wetipquin, Md.	0	0
165. Selbyville, Md.	0	0
166. Assawoman Bay, Md.- Del.	136.56	131.00
167. Berlin, Md.	41.44	12.09
168. Ocean City, Md.	44.36	27.97
169. Public Landing, Md.	0	0
170. Tingles Island, Md.	1,241.50	1,147.73
171. Girdle Tree, Md.- Va.	0	0
172. Boxiron, Md.- Va.	810.21	774.15

(continued on next page)

TABLE 5 (concluded)

Quadrangle	1994	1995
173. Whittington Point, Md.- Va.	475.94	411.06
174. Chincoteague West, Va.	65.12	36.02
175. Chincoteague East, Va.	1,302.39	1,218.27
176. Anacostia, D.C.- Md.	0	0.57
177. East of New Point Comfort, Va.	18.95	21.54
178. Bethel Beach, Va.	3.80	3.58
179. Goose Island, Va.	162.55	157.64
180. Horseshoe Point, Md.	0	0
181. Bowie, Md.	0	0
Total for Chesapeake Bay:	26,484.38	24,251.57
Total for Chincoteague Bay*:	4,117.53	3,758.29

- = Indicates quadrangle not photographed and assumed to have no SAV.
0 = Indicates quadrange photographed and no SAV noted.
# = SAV detected by ground truthing only.
* = Includes Chincoteague Bay, Sinepuxent Bay, Isle of Wight Bay, and Assawoman Bay

TABLE 6

Number of Hectares of SAV in 1994 and 1995 for the CBP Segments and the Zones of Chesapeake Bay and for Chincoteague Bay.

Upper Zone

Segment		1994	1995
CB1	Northern Chesapeake Bay	2,649.85	2,025.04
CB2	Upper Chesapeake Bay	65.11	81.28
CB3	Upper Central Chesapeake Bay	332.11	346.27
WT1	Bush River	0.00	0.00
WT2	Gunpowder River	89.25	68.25
WT3	Middle River	25.02	4.76
WT4	Back River	0.00	0.00
WT5	Patapsco River	0.37	0.00
WT6	Magothy River	18.54	31.67
ET1	Northeast River	7.96	6.86
ET2	Elk and Bohemia Rivers	179.86	136.48
ET3	Sassafras River	76.24	179.77
ET4	Chester River	409.50	443.83
	Zone Total:	3,853.82	3,324.21

Middle Zone

Segment		1994	1995
CB4	Middle Central Chesapeake Bay	0.00	0.00
CB5	Lower Central Chesapeake Bay	3,533.27	3,074.19
WT7	Severn River	31.32	50.97
WT8	South, Rhode, and West Rivers	6.36	1.83
TF1	Upper Patuxent River	75.19	75.13
RET1	Middle Patuxent River	1.52	0.00
LE1	Lower Patuxent River	0.00	0.00
TF2	Upper Potomac River	982.26	643.61
RET2	Middle Potomac River	1,310.23	1,077.51
LE2	Lower Potomac River	139.52	185.21
ET5	Choptank River	0.00	0.00

(continued on next page)

TABLE 6 (concluded)

Middle Zone (concluded)

Segment		1994	1995
ET6	Nanticoke River	0.00	0.00
ET7	Wicomico River	0.00	0.00
ET8	Manokin River	66.63	93.37
ET9	Big Annemessex River	161.79	179.76
ET10	Pocomoke River	0.00	0.00
EE1	Eastern Bay	976.14	1,347.05
EE2	Lower Choptank River	1,513.61	1,498.08
EE3	Tangier Sound	4,575.39	4,049.72
	Zone Total:	13,373.26	12,276.42

Lower Zone

Segment		1994	1995
CB6	Western Lower Chesapeake Bay	592.33	509.10
CB7	Eastern Lower Chesapeake Bay	3,748.74	3,321.33
CB8	Mouth of the Chesapeake Bay	42.65	17.00
TF3	Upper Rappahannock River	0.00	0.00
RET3	Middle Rappahannock River	0.00	0.00
LE3	Lower Rappahannock River	196.51	96.79
TF4	Upper York River	0.00	0.00
RET4	Middle York River	0.00	0.00
LE4	Lower York River	78.29	82.79
WE4	Mobjack Bay	4,592.67	4,608.55
TF5	Upper James River	0.00	0.00
RET5	Middle James River	0.00	0.00
LE5	Lower James River	6.10	15.40
	Zone Total:	9,257.30	8,650.94

Total for Chesapeake Bay:	26,484.38	24,251.57
Total for Chincoteague Bay:	4,117.53	3,758.29

TABLE 7

Number of Hectares of SAV in 1994 and 1995 for each USGS 7.5 Minute Quadrangle of the CBP Segments of Chesapeake Bay and of Chincoteague Bay. Number of Hectares and Acres of SAV in 1994 and 1995 for the CBP Segments and for Chincoteague Bay.

Segment	Quadrangle	1994	1995
CB1	Aberdeen, Md. (2)	11.66	12.13
	Havre de Grace, Md. (3)	2,272.49	1,865.51
	North East, Md. (4)	0.00	0.00
	Perryman, Md. (8)	0.00	0.00
	Spesutie, Md. (9)	365.70	147.40
	Earleville, Md. (10)	0.00	0.00
	Total (hectares):	2,649.85	2,025.04
	Total (acres):	6,547.79	5,003.87
CB2	Perryman, Md. (8)	2.05	6.10
	Spesutie, Md. (9)	19.66	29.13
	Earleville, Md. (10)	41.32	42.45
	Gunpowder Neck, Md. (14)	0.00	0.00
	Hanesville, Md. (15)	2.08	3.60
	Betterton, Md. (16)	0.00	0.00
	Rock Hall, Md. (21)	0.00	0.00
	Total (hectares):	65.11	81.28
	Total (acres):	160.88	200.83
CB3	Middle River, Md. (13)	0.00	0.00
	Gunpowder Neck, Md. (14)	0.00	0.00
	Hanesville, Md. (15)	0.00	0.00
	Sparrows Point, Md. (19)	0.00	0.00
	Swan Point, Md. (20)	14.70	19.62
	Rock Hall, Md. (21)	24.56	25.59
	Gibson Island, Md. (24)	0.00	0.00
	Love Point, Md. (25)	0.00	0.00
	Langford Creek, Md. (26)	292.85	301.06
	Total (hectares):	332.11	346.27
	Total (acres):	820.65	855.62

(continued on next page)

TABLE 7 (continued)

Segment	Quadrangle	1994	1995
CB4	Gibson Island, Md. (24)	0.00	0.00
	Love Point, Md. (25)	0.00	0.00
	Annapolis, Md. (31)	0.00	0.00
	Kent Island, Md. (32)	0.00	0.00
	Deale, Md. (35)	0.00	0.00
	Claiborne, Md. (36)	0.00	0.00
	Lower Marlboro, Md. (41)	0.00	0.00
	North Beach, Md. (42)	0.00	0.00
	Tilghman, Md. (43)	0.00	0.00
	Prince Frederick, Md. (50)	0.00	0.00
	Hudson, Md. (51)	0.00	0.00
	Broomes Island, Md. (60)	0.00	0.00
	Cove Point, Md. (61)	0.00	0.00
	Taylors Island, Md. (62)	0.00	0.00
	Golden Hill, Md. (63)	0.00	0.00
	Bristol, Md. (159)	0.00	0.00
	Horseshoe Point, Md. (180)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
CB5	Cove Point, Md. (61)	0.00	0.00
	Taylors Island, Md. (62)	0.00	0.00
	Solomons Island, Md. (71)	0.00	0.00
	Barren Island, Md. (72)	0.00	0.00
	Honga, Md. (73)	0.00	0.00
	St. Marys City, Md. (80)	0.00	0.00
	Point No Point, Md. (81)	0.00	0.00
	Richland Point, Md. (82)	10.43	0.00
	Bloodsworth Island, Md. (83)	351.35	186.81
	St. George Island, Va.- Md. (89)	0.00	0.00
	Point Lookout, Md. (90)	0.00	0.00
	Kedges Straits, Md. (91)	457.21	330.82
	Heathsville, Va.- Md. (97)	0.00	0.00
	Burgess, Va.- Md. (98)	0.00	0.00
	Ewell, Md.- Va. (99)	1,703.42	1,594.28

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
CB5	Great Fox Island, Va.- Md. (100)	25.33	34.00
	Lively, Va. (105)	0.00	0.00
	Reedville, Va. (106)	258.77	250.12
	Tangier Island, Va. (107)	66.25	67.85
	Irvington, Va. (111)	0.00	0.00
	Fleets Bay, Va. (112)	497.97	452.66
	Deltaville, Va. (118)	0.00	0.00
	Goose Island, Va. (179)	162.55	157.64
	Total (hectares):	3,533.27	3,074.19
	Total (acres):	8,730.72	7,596.31
CB6	Fleets Bay, Va. (112)	0.00	0.00
	Deltaville, Va. (118)	46.28	37.93
	Mathews, Va. (123)	159.95	95.85
	New Point Comfort, Va. (132)	363.36	350.19
	Poquoson East, Va. (141)	0.00	0.00
	Hampton, Va. (147)	0.00	0.00
	East of New Point Comfort, Va. (177)	18.95	21.54
	Bethel Beach, Va. (178)	3.80	3.58
	Total (hectares):	592.33	509.10
	Total (acres):	1,463.66	1,257.98
CB7	Tangier Island, Va. (107)	66.25	66.17
	Chesconessex, Va. (108)	468.27	447.00
	Nandua Creek, Va. (113)	440.03	337.09
	Pungoteague, Va. (114)	879.73	819.50
	Jamesville, Va. (119)	553.76	526.23
	Franktown, Va. (124)	605.08	584.56
	Cape Charles, Va. (133)	482.29	352.72
	Cheriton, Va. (134)	92.24	85.08
	Elliotts Creek, Va. (142)	161.08	102.99
	Townsend, Va. (143)	0.00	0.00
	East of New Point Comfort, Va. (177)	0.00	0.00
	Bethel Beach, Va. (178)	0.00	0.00

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
CB7	Goose Island, Va. (179)	0.00	0.00
	Total (hectares):	3,748.74	3,321.33
	Total (acres):	9,263.13	8,207.01
CB8	Hampton, Va. (147)	0.00	0.00
	Norfolk North, Va. (150)	0.00	0.00
	Little Creek, Va. (151)	0.00	4.00
	Cape Henry, Va. (152)	40.15	12.99
	Kempsville, Va. (156)	0.00	0.00
	Princess Anne, Va. (157)	2.50	0.00
	Total (hectares):	42.65	17.00
	Total (acres):	105.39	42.00
WT1	Edgewood, Md. (7)	0.00	0.00
	Perryman, Md. (8)	0.00	0.00
	Gunpowder Neck, Md. (14)	0.00	0.00
	Hanesville, Md. (15)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
WT2	White Marsh, Md. (6)	0.00	0.00
	Edgewood, Md. (7)	7.03	21.62
	Middle River, Md. (13)	0.00	0.00
	Gunpowder Neck, Md. (14)	82.23	46.63
	Total (hectares):	89.25	68.25
	Total (acres):	220.54	168.65
WT3	Middle River, Md. (13)	9.55	2.39
	Gunpowder Neck, Md. (14)	15.47	2.36
	Total (hectares):	25.02	4.76
	Total (acres):	61.81	11.75

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
WT4	Baltimore East, Md. (12)	0.00	0.00
	Middle River, Md. (13)	0.00	0.00
	Sparrows Point, Md. (19)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
WT5	Baltimore East, Md. (12)	0.00	0.00
	Middle River, Md. (13)	0.00	0.00
	Curtis Bay, Md. (18)	0.37	0.00
	Sparrows Point, Md. (19)	0.00	0.00
	Round Bay, Md. (23)	0.00	0.00
	Gibson Island, Md. (24)	0.00	0.00
	Total (hectares):	0.37	0.00
	Total (acres):	0.92	0.00
WT6	Round Bay, Md. (23)	0.67	2.69
	Gibson Island, Md. (24)	17.88	28.99
	Total (hectares):	18.54	31.67
	Total (acres):	45.82	78.26
WT7	Curtis Bay, Md. (18)	0.00	0.00
	Round Bay, Md. (23)	31.32	50.97
	Gibson Island, Md. (24)	0.00	0.00
	South River, Md. (30)	0.00	0.00
	Annapolis, Md. (31)	0.00	0.00
	Total (hectares):	31.32	50.97
	Total (acres):	77.39	125.94
WT8	Round Bay, Md. (23)	0.00	0.00
	South River, Md. (30)	1.69	1.83
	Annapolis, Md. (31)	0.00	0.00
	Deale, Md. (35)	4.68	0.00
	Bristol, Md. (159)	0.00	0.00
	Horseshoe Point, Md. (180)	0.00	0.00

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
WT8	Bowie, Md. (181)	0.00	0.00
	Total (hectares):	6.36	1.83
	Total (acres):	15.73	4.52
TF1	Deale, Md. (35)	0.00	0.00
	Lower Marlboro, Md. (41)	51.61	54.02
	North Beach, Md. (42)	0.00	0.00
	Benedict, Md. (49)	0.00	0.00
	Prince Frederick, Md. (50)	0.00	0.00
	Bristol, Md. (159)	23.59	21.11
	Total (hectares):	75.19	75.13
	Total (acres):	185.80	185.65
RET1	Benedict, Md. (49)	1.52	0.00
	Prince Frederick, Md. (50)	0.00	0.00
	Mechanicsville, Md. (59)	0.00	0.00
	Broomes Island, Md. (60)	0.00	0.00
	Charlotte Hall, Md. (162)	0.00	0.00
	Total (hectares):	1.52	0.00
	Total (acres):	3.76	0.00
LE1	Prince Frederick, Md. (50)	0.00	0.00
	Mechanicsville, Md. (59)	0.00	0.00
	Broomes Island, Md. (60)	0.00	0.00
	Cove Point, Md. (61)	0.00	0.00
	Leonardtown, Md. (69)	0.00	0.00
	Hollywood, Md. (70)	0.00	0.00
	Solomons Island, Md. (71)	0.00	0.00
	Charlotte Hall, Md. (162)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
TF2	Washington West, Md.- D.C.- Va (28)	24.60	39.70
	Washington East, D.C.- Md. (29)	0.66	0.99
	Alexandria, Va.- D.C.- Md. (34)	284.63	277.80

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
TF2	Fort Belvoir, Va.- Md. (39)	144.36	115.37
	Mt. Vernon, Md.- Va. (40)	122.48	111.84
	Quantico, Va.- Md. (47)	150.92	58.99
	Indian Head, Va.- Md. (48)	254.62	38.35
	Port Tobacco, Md. (161)	0.00	0.00
	Anacostia, D.C.- Md. (176)	0.00	0.57
	Total (hectares):	982.26	643.61
	Total (acres):	2,427.17	1,590.37
RET2	Quantico, Va.- Md. (47)	236.89	218.23
	Indian Head, Va.- Md. (48)	0.00	0.00
	Widewater, Va.- Md. (55)	540.33	246.08
	Nanjemoy, Md. (56)	91.78	106.20
	Mathias Point, Md.- Va. (57)	253.19	244.02
	Popes Creek, Md. (58)	1.66	2.40
	Passapatanzy, Md.- Va. (64)	62.36	121.26
	King George, Va.- Md. (65)	80.59	85.96
	Dahlgren, Va.- Md. (66)	26.74	36.21
	Colonial Beach North, Md.- Va. (67)	16.69	17.15
	Port Tobacco, Md. (161)	0.00	0.00
	Charlotte Hall, Md. (162)	0.00	0.00
	Total (hectares):	1,310.23	1,077.51
	Total (acres):	3,237.59	2,662.53
LE2	Popes Creek, Md. (58)	0.00	0.00
	Mechanicsville, Md. (59)	0.00	0.00
	King George, Va.- Md. (65)	0.00	0.00
	Dahlgren, Va.- Md. (66)	4.47	5.26
	Colonial Beach North, Md.- Va. (67)	83.08	108.05
	Rock Point, Md. (68)	36.79	12.84
	Leonardtown, Md. (69)	0.00	18.57
	Hollywood, Md. (70)	0.00	0.00
	Solomons Island, Md. (71)	0.00	0.00
	Colonial Beach South, Va.- Md. (76)	0.00	0.00
	Stratford Hall, Va.- Md. (77)	7.69	9.31

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
LE2	St. Clements Island, Va.- Md. (78)	0.00	19.11
	Piney Point, Md.- Va. (79)	0.00	0.00
	St. Marys City, Md. (80)	0.00	2.89
	Champlain, Va. (86)	0.00	0.00
	Machodoc, Va. (87)	0.00	0.00
	Kinsale, Va.- Md. (88)	0.00	0.00
	St. George Island, Va.- Md. (89)	0.00	0.00
	Point Lookout, Md. (90)	0.00	0.00
	Lottsburg, Va. (96)	0.00	0.00
	Heathsville, Va.- Md. (97)	0.00	0.00
	Burgess, Va.- Md. (98)	0.00	0.00
	Lively, Va. (105)	0.00	0.00
	Charlotte Hall, Md. (162)	7.49	9.17
	Total (hectares):	139.52	185.21
	Total (acres):	344.76	457.65
TF3	Passapatanzy, Md.- Va. (64)	0.00	0.00
	King George, Va.- Md. (65)	0.00	0.00
	Colonial Beach South, Va.- Md. (76)	0.00	0.00
	Champlain, Va. (86)	0.00	0.00
	Mount Landing, Va. (94)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
RET3	Champlain, Va. (86)	0.00	0.00
	Machodoc, Va. (87)	0.00	0.00
	Mount Landing, Va. (94)	0.00	0.00
	Tappahannock, Va. (95)	0.00	0.00
	Lottsburg, Va. (96)	0.00	0.00
	Dunnsville, Va. (103)	0.00	0.00
	Morattico, Va. (104)	0.00	0.00
	Lively, Va. (105)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
LE3	Morattico, Va. (104)	0.00	0.00
	Lively, Va. (105)	0.00	0.00
	Urbanna, Va. (110)	0.00	0.00
	Irvington, Va. (111)	57.74	11.73
	Fleets Bay, Va. (112)	0.00	0.00
	Saluda, Va. (116)	0.00	0.00
	Wilton, Va. (117)	2.44	0.00
	Deltaville, Va. (118)	123.77	82.54
	Ware Neck, Va. (122)	0.00	0.00
	Mathews, Va. (123)	12.56	2.51
	Total (hectares):	196.51	96.79
	Total (acres):	485.58	239.16
TF4	Dunnsville, Va. (103)	0.00	0.00
	West Point, Va. (115)	0.00	0.00
	Toano, Va. (120)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
RET4	West Point, Va. (115)	0.00	0.00
	Saluda, Va. (116)	0.00	0.00
	Toano, Va. (120)	0.00	0.00
	Gressitt, Va. (121)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
LE4	Toano, Va. (120)	0.00	0.00
	Gressitt, Va. (121)	0.00	0.00
	Norge, Va. (128)	0.00	0.00
	Williamsburg, Va. (129)	0.00	0.00
	Clay Bank, Va. (130)	0.00	0.00
	Achilles, Va. (131)	52.46	53.07
	Hog Island, Va. (138)	0.00	0.00
	Yorktown, Va. (139)	4.47	4.59

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
LE4	Poquoson West, Va. (140)	21.37	25.13
	Total (hectares):	78.29	82.79
	Total (acres):	193.46	204.56
WE4	Ware Neck, Va. (122)	283.95	291.20
	Mathews, Va. (123)	44.98	41.96
	Clay Bank, Va. (130)	0.00	0.00
	Achilles, Va. (131)	1,043.70	1,046.23
	New Point Comfort, Va. (132)	1,165.71	1,179.02
	Yorktown, Va. (139)	0.00	0.00
	Poquoson West, Va. (140)	559.66	558.75
	Poquoson East, Va. (141)	1,154.29	1,156.63
	Newport News North, Va. (146)	0.00	0.00
	Hampton, Va. (147)	340.38	334.77
	Total (hectares):	4,592.67	4,608.55
	Total (acres):	11,348.49	11,387.72
TF5	Westover, Va. (125)	0.00	0.00
	Charles City, Va. (126)	0.00	0.00
	Brandon, Va. (127)	0.00	0.00
	Savedge, Va. (135)	0.00	0.00
	Claremont, Va. (136)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
RET5	Toano, Va. (120)	0.00	0.00
	Charles City, Va. (126)	0.00	0.00
	Brandon, Va. (127)	0.00	0.00
	Norge, Va. (128)	0.00	0.00
	Williamsburg, Va. (129)	0.00	0.00
	Claremont, Va. (136)	0.00	0.00
	Surry, Va. (137)	0.00	0.00
	Hog Island, Va. (138)	0.00	0.00

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
RET5	Bacons Castle, Va. (144)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
LE5	Williamsburg, Va. (129)	0.00	0.00
	Hog Island, Va. (138)	0.00	0.00
	Yorktown, Va. (139)	0.00	0.00
	Poquoson West, Va. (140)	0.00	0.00
	Bacons Castle, Va. (144)	0.00	0.00
	Mulberry Island, Va. (145)	0.00	0.00
	Newport News North, Va. (146)	0.00	0.00
	Hampton, Va. (147)	6.10	15.40
	Benns Church, Va. (148)	0.00	0.00
	Newport News South, Va. (149)	0.00	0.00
	Norfolk North, Va. (150)	0.00	0.00
	Little Creek, Va. (151)	0.00	0.00
	Chuckatuck, Va. (153)	0.00	0.00
	Bowers Hill, Va. (154)	0.00	0.00
	Norfolk South, Va. (155)	0.00	0.00
	Kempsville, Va. (156)	0.00	0.00
	Total (hectares):	6.10	15.40
	Total (acres):	15.08	38.05
ET1	Havre de Grace, Md. (3)	0.00	0.01
	North East, Md. (4)	7.96	6.85
	Total (hectares):	7.96	6.86
	Total (acres):	19.67	16.96
ET2	North East, Md. (4)	125.42	33.99
	Elkton, Md.-Del. (5)	0.00	37.11
	Spesutie, Md. (9)	0.00	0.00
	Earleville, Md. (10)	54.44	65.38
	Cecilton, Md. (11)	0.00	0.00
	Total (hectares):	179.86	136.48
	Total (acres):	444.44	337.25

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
ET3	Spesutie, Md. (9)	11.85	31.91
	Earleville, Md. (10)	1.00	16.48
	Cecilton, Md. (11)	0.00	0.00
	Betterton, Md. (16)	52.92	85.73
	Galena, Md. (17)	10.47	45.66
	Total (hectares):	76.24	179.77
	Total (acres):	188.39	444.22
ET4	Hanesville, Md. (15)	0.00	0.00
	Betterton, Md. (16)	0.00	0.00
	Galena, Md. (17)	0.00	0.00
	Rock Hall, Md. (21)	14.43	17.11
	Chestertown, Md. (22)	0.00	0.00
	Love Point, Md. (25)	0.00	0.00
	Langford Creek, Md. (26)	272.24	269.63
	Centreville, Md. (27)	0.00	0.00
	Kent Island, Md. (32)	4.48	24.82
	Queenstown, Md. (33)	118.35	132.26
	Wye Mills, Md. (158)	0.00	0.00
	Total (hectares):	409.50	443.83
	Total (acres):	1,011.87	1,096.70
ET5	Easton, Md. (38)	0.00	0.00
	Oxford, Md. (44)	0.00	0.00
	Trappe, Md. (45)	0.00	0.00
	Preston, Md. (46)	0.00	0.00
	Church Creek, Md. (52)	0.00	0.00
	Cambridge, Md. (53)	0.00	0.00
	East New Market, Md. (54)	0.00	0.00
	Wye Mills, Md. (158)	0.00	0.00
	Fowling Creek, Md. (160)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
ET6	East New Market, Md. (54)	0.00	0.00

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TABLE 7 (continued)

Segment	Quadrangle	1994	1995
ET6	Nanticoke, Md. (75)	0.00	0.00
	Deal Island, Md. (84)	0.00	0.00
	Mardela Springs, Md. (163)	0.00	0.00
	Wetipquin, Md. (164)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
ET7	Nanticoke, Md. (75)	0.00	0.00
	Deal Island, Md. (84)	0.00	0.00
	Monie, Md. (85)	0.00	0.00
	Wetipquin, Md. (164)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
ET8	Deal Island, Md. (84)	14.81	30.09
	Monie, Md. (85)	5.58	4.21
	Terrapin Sand Point, Md. (92)	1.83	7.84
	Marion, Md. (93)	44.42	51.22
	Total (hectares):	66.63	93.37
	Total (acres):	164.65	230.71
ET9	Marion, Md. (93)	161.79	179.76
	Total (hectares):	161.79	179.76
	Total (acres):	399.79	444.20
ET10	Saxis, Va.- Md. (102)	0.00	0.00
	Total (hectares):	0.00	0.00
	Total (acres):	0.00	0.00
EE1	Love Point, Md. (25)	0.00	0.00
	Kent Island, Md. (32)	252.32	511.79
	Queenstown, Md. (33)	154.62	222.09
	Claiborne, Md. (36)	281.74	299.55
	St. Michaels, Md. (37)	287.46	313.61
	Easton, Md. (38)	0.00	0.00

(continued on next page)

TABLE 7 (continued)

Segment	Quadrangle	1994	1995
EE1	Tilghman, Md. (43)	0.00	0.00
	Oxford, Md. (44)	0.00	0.00
	Wye Mills, Md. (158)	0.00	0.00
	Total (hectares):	976.14	1,347.05
	Total (acres):	2,412.05	3,328.55
EE2	Claiborne, Md. (36)	280.50	238.54
	St. Michaels, Md. (37)	146.33	132.82
	Easton, Md. (38)	0.00	6.24
	Tilghman, Md. (43)	336.84	289.63
	Oxford, Md. (44)	330.72	321.71
	Trappe, Md. (45)	7.04	12.74
	Hudson, Md. (51)	282.71	409.69
	Church Creek, Md. (52)	75.67	78.59
	Cambridge, Md. (53)	0.00	0.00
	Taylors Island, Md. (62)	53.78	8.11
	Golden Hill, Md. (63)	0.00	0.00
	Total (hectares):	1,513.61	1,498.08
	Total (acres):	3,740.13	3,701.76
EE3	Taylors Island, Md. (62)	0.00	0.00
	Golden Hill, Md. (63)	57.77	34.78
	Honga, Md. (73)	797.99	410.06
	Wingate, Md. (74)	503.47	407.63
	Nanticoke, Md. (75)	0.00	0.00
	Richland Point, Md. (82)	4.24	0.00
	Bloodsworth Island, Md. (83)	204.29	257.09
	Deal Island, Md. (84)	0.21	0.25
	Kedges Straits, Md. (91)	175.22	155.42
	Terrapin Sand Point, Md. (92)	171.19	175.25
	Marion, Md. (93)	29.91	31.50
	Ewell, Md.- Va. (99)	1.93	2.49
	Great Fox Island, Va.- Md. (100)	1,120.55	1,126.80
	Crisfield, Md.- Va. (101)	179.13	179.82
	Saxis, Va.- Md. (102)	0.00	2.53

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TABLE 7 (concluded)

Segment	Quadrangle	1994	1995
EE3	Tangier Island, Va. (107)	353.30	330.14
	Chesconessex, Va. (108)	568.88	545.68
	Parksley, Va. (109)	407.32	390.29
	Total (hectares):	4,575.39	4,049.72
	Total (acres):	11,305.78	10,006.86
Chincoteague	Selbyville, Md. (165)	0.00	0.00
	Assawoman Bay, Md.- Del. (166)	136.56	131.00
	Berlin, Md. (167)	41.44	12.09
	Ocean City, Md. (168)	44.36	27.97
	Public Landing, Md. (169)	0.00	0.00
	Tingles Island, Md. (170)	1,241.50	1,147.73
	Girdle Tree, Md.- Va. (171)	0.00	0.00
	Boxiron, Md.- Va. (172)	810.21	774.15
	Whittington Point, Md.- Va. (173)	475.94	411.06
	Chincoteague West, Va. (174)	65.12	36.02
	Chincoteague East, Va. (175)	1,302.39	1,218.27
	Total (hectares):	4,117.53	3758.29
	Total (acres):	10,174.41	9286.74

TABLE 8

Number of Hectares and the Percentage of SAV in 1994 and 1995 by Density Class for the CBP Segments of Chesapeake Bay and for Chincoteague Bay.

Segment	Year	Class 1		Class 2		Class 3		Class 4		Total
CB1	1994	2,311.15	87%	132.90	5%	43.55	2%	162.25	6%	2,649.85
	1995	1,642.75	81%	165.53	8%	31.70	2%	185.06	9%	2,025.04
CB2	1994	2.49	4%	34.92	54%	4.36	7%	23.34	36%	65.11
	1995	0.79	1%	10.94	13%	9.37	12%	60.17	74%	81.28
CB3	1994	2.42	1%	46.11	14%	20.85	6%	262.73	79%	332.11
	1995	20.61	6%	9.94	3%	14.74	4%	300.97	87%	346.27
CB4	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
CB5	1994	299.85	8%	1,662.33	47%	839.08	24%	732.02	21%	3,533.27
	1995	287.82	9%	1,571.16	51%	146.47	5%	1,068.73	35%	3,074.19
CB6	1994	108.91	18%	168.16	28%	257.99	44%	57.28	10%	592.33
	1995	89.01	17%	146.53	29%	63.10	12%	210.46	41%	509.10
CB7	1994	591.30	16%	1,489.50	40%	795.01	21%	872.93	23%	3,748.74
	1995	972.25	29%	758.94	23%	440.00	13%	1,150.14	35%	3,321.33
CB8	1994	13.17	31%	29.48	69%	0.00	0%	0.00	0%	42.65
	1995	8.89	52%	4.78	28%	0.00	0%	3.32	20%	17.00
WT1	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
WT2	1994	0.12	0%	24.37	27%	25.51	29%	39.25	44%	89.25
	1995	2.73	4%	37.56	55%	25.82	38%	2.14	3%	68.25
WT3	1994	0.00	0%	11.68	47%	13.34	53%	0.00	0%	25.02
	1995	1.46	31%	2.38	50%	0.92	19%	0.00	0%	4.76
WT4	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00

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TABLE 8 (continued)

WT5	1994	0.00	0%	0.37	100%	0.00	0%	0.00	0%	0.37
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
WT6	1994	1.31	7%	6.73	36%	8.65	47%	1.84	10%	18.54
	1995	0.62	2%	10.66	34%	15.24	48%	5.15	16%	31.67
WT7	1994	3.91	12%	10.72	34%	16.70	53%	0.00	0%	31.32
	1995	4.93	10%	16.93	33%	8.31	16%	20.79	41%	50.97
WT8	1994	0.00	0%	5.48	86%	0.89	14%	0.00	0%	6.36
	1995	0.00	0%	1.83	100%	0.00	0%	0.00	0%	1.83
TF1	1994	0.00	0%	0.00	0%	13.41	18%	61.79	82%	75.19
	1995	0.00	0%	14.05	19%	26.98	36%	34.10	45%	75.13
RET1	1994	0.00	0%	0.00	0%	1.52	100%	0.00	0%	1.52
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
LE1	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
TF2	1994	86.72	9%	86.70	9%	94.03	10%	714.81	73%	982.26
	1995	14.13	2%	50.81	8%	52.95	8%	525.73	82%	643.61
RET2	1994	32.45	2%	68.93	5%	59.29	5%	1,149.57	88%	1,310.23
	1995	5.75	1%	75.94	7%	27.07	3%	968.74	90%	1,077.51
LE2	1994	6.75	5%	25.13	18%	12.11	9%	95.52	68%	139.52
	1995	0.00	0%	6.81	4%	51.59	28%	126.81	68%	185.21
TF3	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
RET3	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
LE3	1994	81.57	42%	99.88	51%	11.11	6%	3.96	2%	196.51
	1995	66.75	69%	26.42	27%	3.62	4%	0.00	0%	96.79
TF4	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00

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TABLE 8 (continued)

RET4	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
LE4	1994	9.39	12%	8.50	11%	0.00	0%	60.40	77%	78.29
	1995	12.34	15%	4.29	5%	10.57	13%	55.57	67%	82.79
WE4	1994	348.00	8%	555.48	12%	426.44	9%	3,262.76	71%	4,592.67
	1995	265.83	6%	757.23	16%	382.89	8%	3,202.59	69%	4,608.55
TF5	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
RET5	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
LE5	1994	0.00	0%	0.00	0%	6.10	100%	0.00	0%	6.10
	1995	9.29	60%	0.00	0%	6.11	40%	0.00	0%	15.40
ET1	1994	5.97	75%	0.00	0%	1.99	25%	0.00	0%	7.96
	1995	0.01	0%	6.85	100%	0.00	0%	0.00	0%	6.86
ET2	1994	126.10	70%	44.70	25%	9.06	5%	0.00	0%	179.86
	1995	44.20	32%	82.37	60%	8.28	6%	1.65	1%	136.48
ET3	1994	60.27	79%	4.52	6%	0.00	0%	11.44	15%	76.24
	1995	44.30	25%	101.52	56%	33.96	19%	0.00	0%	179.77
ET4	1994	19.96	5%	74.54	18%	114.59	28%	200.41	49%	409.50
	1995	7.07	2%	124.41	28%	76.91	17%	235.42	53%	443.83
ET5	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
ET6	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
ET7	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
ET8	1994	0.00	0%	51.39	77%	15.25	23%	0.00	0%	66.63
	1995	0.00	0%	43.32	46%	41.89	45%	8.16	9%	93.37

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TABLE 8 (concluded)

ET9	1994	0.00	0%	55.44	34%	106.36	66%	0.00	0%	161.79
	1995	21.77	12%	47.97	27%	26.31	15%	83.72	47%	179.76
ET10	1994	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
	1995	0.00	0%	0.00	0%	0.00	0%	0.00	0%	0.00
EE1	1994	103.55	11%	480.67	49%	350.98	36%	40.94	4%	976.14
	1995	173.10	13%	700.04	52%	263.29	20%	210.62	16%	1,347.05
EE2	1994	15.81	1%	390.36	26%	475.56	31%	631.89	42%	1,513.61
	1995	108.92	7%	508.15	34%	461.79	31%	419.22	28%	1,498.08
EE3	1994	246.94	5%	1,795.93	39%	1,416.68	31%	1,115.84	24%	4,575.39
	1995	397.68	10%	1,121.02	28%	691.98	17%	1,839.03	45%	4,049.72
Chincoteague Bay	1994	60.60	1%	511.27	12%	1,282.61	31%	2,263.04	55%	4,117.53
	1995	445.03	12%	898.84	24%	1,838.21	49%	576.20	15%	3,758.29

TABLE 9

Total Area of SAV in Hectares by Density Class for the Three Zones of Chesapeake Bay and for Chincoteague Bay in 1994 and 1995, including the Percentage of the Zone Total.

1994	Class 1		Class 2		Class 3		Class 4		Total
Upper	2,529.82	66%	380.85	10%	241.88	6%	701.26	18%	3,853.82
Middle	795.98	6%	4,633.05	35%	3,401.85	25%	4,542.37	34%	13,373.26
Lower	1,152.34	12%	2,350.99	25%	1,496.65	16%	4,257.32	46%	9,257.30
Total	4,478.14	17%	7,364.89	28%	5,140.39	19%	9,500.96	36%	26,484.38
Chincoteague	60.60	1%	511.27	12%	1,282.61	31%	2,263.04	55%	4,117.53

1995	Class 1		Class 2		Class 3		Class 4		Total
Upper	1,764.54	53%	552.17	17%	216.93	6%	790.56	24%	3,324.21
Middle	1,014.10	8%	4,158.03	34%	1,798.63	15%	5,305.66	43%	12,276.42
Lower	1,424.36	16%	1,698.20	20%	906.29	10%	4,622.09	53%	8,650.94
Total	4,200.00	17%	6,408.40	26%	2,921.86	12%	10,718.31	44%	24,251.57
Chincoteague	445.03	12%	898.84	24%	1838.21	49%	576.20	15%	3758.29

1994	Classes 1 and 2		Classes 3 and 4		Total
Upper	2,910.67	76%	943.15	24%	3,853.82
Middle	5,429.03	41%	7,944.23	59%	13,373.26
Lower	3,503.32	38%	5,753.98	62%	9,257.30
Total	11,843.03	45%	14,641.35	55%	26,484.38
Chincoteague	571.87	14%	3,545.65	86%	4,117.53

1995	Classes 1 and 2		Classes 3 and 4		Total
Upper	2,316.71	70%	1,007.49	30%	3,324.21
Middle	5,172.13	42%	7,104.29	58%	12,276.42
Lower	3,122.56	36%	5,528.38	64%	8,650.94
Total	10,611.40	44%	13,640.17	56%	24,251.57
Chincoteague	1,343.88	36%	2,414.41	64%	3,758.29

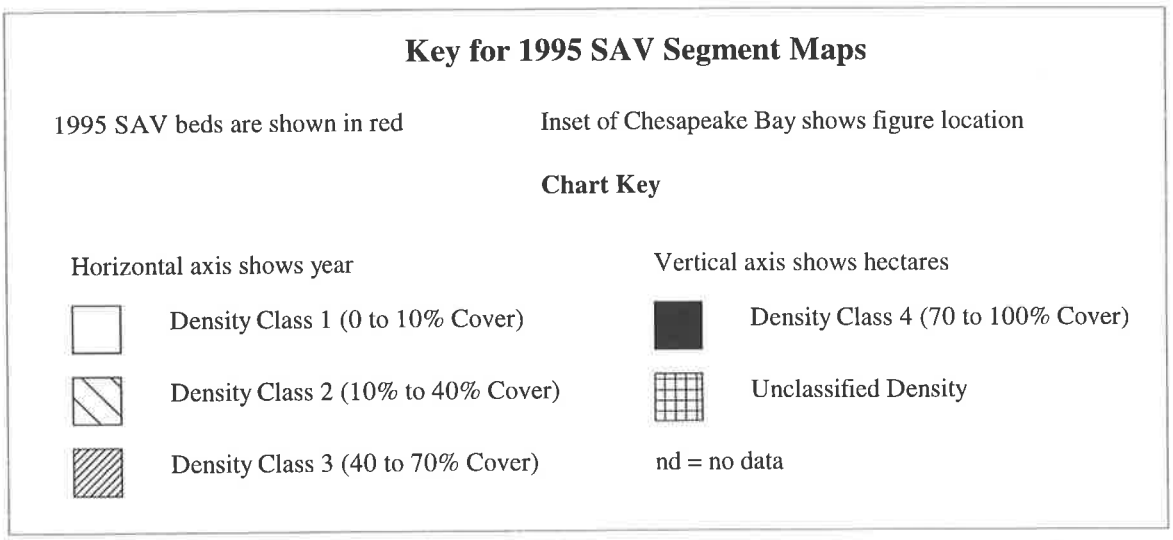

Figure 10. Key for 1995 Chesapeake Bay Program Segment SAV Maps.

place names not found on the CBP segment plots are on quadrangle maps for that segment in Appendix B. A key for the 1995 segment maps is shown in Figure 10.

1995 SUMMARY

SAV in the Chesapeake Bay decreased 8% in 1995 to a total of 24,251.57 hectares mapped from aerial photography, a 2,232.81 hectare decline from the 26,484.38 hectares mapped in 1994 (Figure 1; Table 6). This follows a 10% decrease in 1994 from the 29,587.47 hectares in 1993 and is the lowest level since the 1989 level of 24,151.49 hectares (Table 6; VIMS SAV GIS Database). SAV also decreased in all three zones of the Chesapeake Bay in 1995 (14%, 8%, and 7% in the Upper, Middle, and Lower zones, respectively) compared to 1994 when SAV increased only in the Upper zone (44%) and decreased in the Middle and Lower zones 21% and 8%, respectively, from totals in 1993 (Figure 2; Table 6; Orth *et al.,* 1995). In 1995, SAV decreased 529.61 hectares in the Upper zone, with a total of 3,324.21 hectares (14% of the Bay total) mapped, compared with 3,853.82 hectares (15% of the Bay total) mapped in 1994 (Figure 2; Table 6). SAV decreased 1,096.84 hectares in the Middle zone in 1995, with 12,276.42 hectares (51% of the Bay total) mapped, compared to 13,373.26 hectares (50% of the Bay total) mapped in 1994 (Figure 2; Table 6). SAV decreased 606.36 hectares in the Lower zone, with 8,650.94 hectares (36% of the Bay total) mapped, compared to 9,257.30 hectares (35% of the Bay total) mapped in 1994 (Figure 2; Table 6). SAV increased in five segments in the Upper Bay zone in 1995, decreased in six (WT5 became unvegetated), and WT1 and WT4 remained unvegetated, compared to 1994, when SAV increased from 1993 levels in all segments except for WT1 and WT4 which remained unvegetated (Figure 3; Tables 6 and 7; Orth *et al.,* 1995). As in 1994, increases in 1995 for some segments of the Middle and Lower zones did not offset larger decreases in 1995 in other segments of these zones (Tables 6

and 7). In the Middle Bay zone in 1995, there were increases in five segments, decreases in eight, and seven were unvegetated (six of these remained unvegetated from 1994) compared to 1994 when there were increases in six segments, decreases in ten, and six were unvegetated; and in the Lower Bay zone in 1995, there were increases in three segments, decreases in four, and six remained unvegetated from 1994, compared to 1994 when there were increases in three segments, decreases in four, and six were unvegetated (Figures 4 and 5; Tables 6 and 7; Orth *et al.,* 1995).

In 1995, SAV in the Bay increased in thirteen segments (Upper zone: CB2, CB3, WT6, ET3, ET4; Middle zone: WT7, LE2, ET8, ET9, EE1; and Lower zone: LE4, LE5, WE4), compared to twenty segments in 1994 (Upper zone: CB1, CB2, CB3, WT2, WT3, WT5, WT6, ET1, ET2, ET3, ET4; Middle zone: WT7, WT8, TF1, RET1, LE2, EE1; and Lower zone: CB8, LE4, LE5) (Tables 6 and 7; Orth *et al.,* 1995). In 1995, SAV decreased in eighteen segments (Upper zone: CB1, WT2, WT3, WT5, ET1, ET2; Middle zone: CB5, WT8, TF1, RET1, TF2, RET2, EE2, EE3; Lower zone: CB6, CB7, CB8, LE3) compared to fourteen segments in 1994 (Middle zone: CB4, CB5, LE1, TF2, RET2, ET5, ET8, ET9, EE2, EE3; and Lower zone: CB6, CB7, LE3, WE4) (Tables 6 and 7; Orth *et al.,* 1995). In 1995, sixteen were unvegetated (Upper zone: WT1, WT4, WT5; Middle zone: CB4, RET1, LE1, ET5, ET6, ET7, ET10; and Lower zone: TF3, RET3, TF4, RET4, TF5, RET5), compared to fourteen in 1994 (Upper zone: WT1, WT4; Middle zone: CB4, LE1, ET5, ET6, ET7, ET10; and Lower zone: TF3, RET3, TF4, RET4, TF5, RET5) (Tables 6 and 7; Orth *et al.,* 1995). [The mainstem upper and middle Rappahannock River, TF3 and RET3, upper and middle York River, TF4 and RET4, and upper and middle James River, TF5 and RET5, have been devoid of submerged vegetation for years and are not currently photographed (Methods; Figure 6)]. There were no segments which were unvegetated in 1994 which had SAV detected by photography in 1995 (Tables 6 and 7). Two segments (Upper zone: WT5; Middle zone: RET1) which were vegetated in 1994, albeit with relatively small amounts, had no SAV detected in 1995, compared to three segments (CB4, LE1, and ET5), all in the Middle zone, which were vegetated in 1993 but had no SAV detected in 1994 or 1995 (Tables 6 and 7; Orth *et al.,* 1995).

In the Bay in 1995, 44% of SAV was categorized as dense (density class 4, or 70-100% coverage), up slightly from the 1994 amount of 36% (Table 9). In 1995, 12% of SAV was categorized as moderate (density class 3, or 40-70% coverage), down slightly from the 1994 amount of 19% (Table 9). There was 26% of SAV categorized as sparse (density class 2, or 10-40% coverage), a decrease compared with the 1994 amount of 28%; whereas 17% was categorized as very sparse (density class 1, or 0-10% coverage), the same as in 1994 (Table 9). SAV in the very sparse and sparse classes combined (the 0-40% coverage range) constituted 44% of all SAV in 1995, a slight decrease from 45% in 1994 (Table 9). Conversely, SAV in the moderate and dense classes combined (the 40-100% coverage range) constituted 56% of all SAV in 1995, an slight increase from 55% in 1994 (Table 9).

The Chincoteague Bay section (consisting of Chincoteague, Assawoman, Sinepuxent, and Isle of Wight bays) had 3,758.29 hectares in 1995, with 15% classified dense, compared to 4,117.53 hectares in 1994, with 55% classified dense (Figure 2; Tables 5-9).

DISCUSSION OF CBP SEGMENTS ARRANGED WITHIN ZONES

Upper Bay Zone

NORTHERN CHESAPEAKE BAY (CB1)

SAV in CB1 decreased 24% (624.81 hectares) in 1995, after a 50% increase in 1994: 2,025.04 hectares were mapped in 1995; 2,649.85 hectares in 1994 (Figure 11; Tables 6 and 7; Orth *et al.*, 1995). CB1 had 66% of its Tier I goal of 3,078.10 hectares in 1995 (Figure 11). CB1 continued to have the largest percentage of SAV in the Upper Bay zone in 1995 despite the large decline in total hectares, although the percentage had decreased: in 1995, 61% of the SAV in the Upper Bay zone was mapped in CB1 whereas in 1994, the percentage was 69% (Tables 6 and 7; Orth *et al.*, 1995). This decrease reflects the decline of SAV in CB1 as well as concomitant increases in SAV abundance in other segments of this zone, namely CB2, CB3, WT6, ET3, and ET4 (Tables 6 and 7). Historically, the segment with the largest percentage of SAV in the Upper Bay zone ever recorded by the aerial survey was CB1 in 1989, which had 1,944.87 hectares or 79% of the 2,457.11 hectares in the Upper Bay zone (VIMS SAV GIS Database). In 1993, 66% of SAV in the Upper Bay zone was in CB1, in 1992 it was 71%, and in 1991 it was 78% (Orth *et al.*, 1995). The lowest percentage of SAV of the Upper Bay zone occurring in CB1 was 27% in 1978 (VIMS SAV GIS Database).

In CB1 in 1995, there was a small net increase in SAV density over 1994: 81% of SAV was classified very sparse, 8% sparse, 2% moderate, and 9% dense, whereas in 1994, 87% of SAV was classified very sparse, 5% sparse, 2% moderate, and 6% dense (Figure 11; Table 8). This was essentially the same pattern recorded since 1991 in CB1: very sparse SAV constituting more than 80% of the SAV and lesser amounts distributed in the other three density classes (Orth *et al.*, 1995).

SAV beds were located in seven main areas of CB1: 1) sparse to dense fringing beds in the Susquehanna River (from Robert Island to the river mouth, at Concord Point on the western shore and at Stump Point on the eastern shore); 2) a large area of very sparse SAV located in the broad shoal (Susquehanna Flats) at the Susquehanna River mouth; 3) sparse to dense beds fringing the shore from Concord Point south to Swan Creek; 4) predominately very sparse beds located around Battery Island; 5) dense to very sparse beds east of Stump Point at Mill Creek, Furnace Bay, Baker Cove, High Point, and Carpenter Point; 6) small, fringing beds of sparse to moderate density in the Spesutie Narrows; and 7) a large, sparse bed east of Spesutie Island (Figure 11; Appendix B: Maps 2, 3, 9). A large (approximately 580 hectares), predominately very sparse bed of *Myriophyllum spicatum, Hydrilla verticillata,* and *Ceratophyllum demersum,* located south of Havre de Grace to Swan Creek in 1994, was absent in 1995 and accounts for most of the 625 hectare decrease in 1995 (Figure 11;

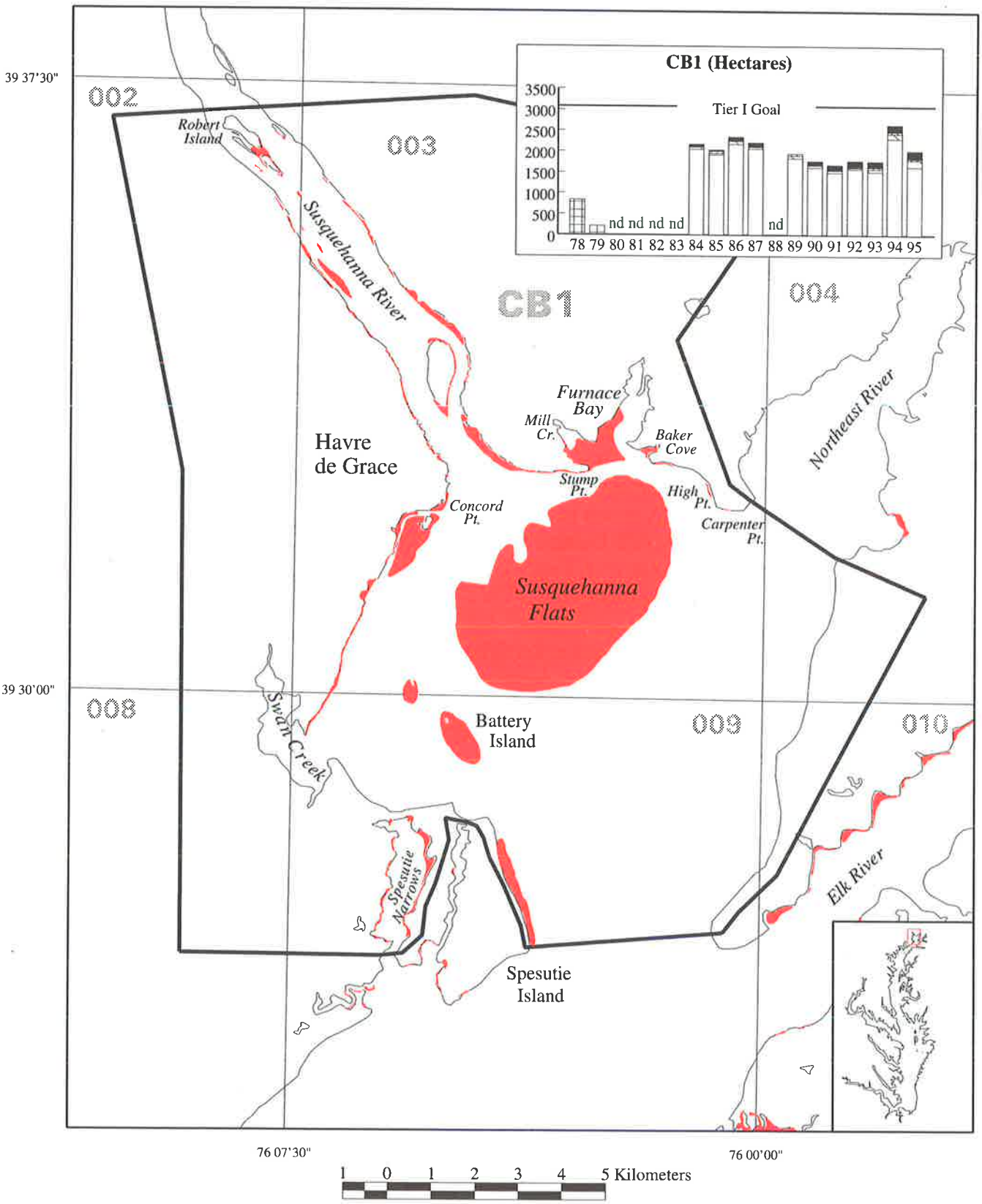

Figure 11: Distribution of SAV in the Northern Chesapeake Bay (Segment CB1) in 1995.

Tables 6 and 7; Appendix B: Maps 3, 9; Orth *et al.,* 1995). A total of six species of SAV (*H. verticillata, M. spicatum, C. demersum, Heteranthera dubia, Vallisneria americana, Najas guadalupensis*) plus an unknown species of *Najas* were reported in 1995 from CB1, either by Stan Kollar of Harford Community College or the Citizens' survey (Appendices B and D: Maps 2, 3, 9). *Hydrilla verticillata* and the other species were reported extending throughout CB1 from Robert Island in the Susquehanna River (Map 2), to Spesutie Island (Map 9), and to Furnace Bay and the Susquehanna Flats (Map 3) (Appendices B and D). In 1994, three additional species were reported from CB1 which were not seen in 1995: *Najas minor, Najas gracillima,* and *Elodea canadensis* (Orth *et al.,* 1995).

NORTHEAST, ELK AND BOHEMIA, AND SASSAFRAS RIVERS (ET1, ET2, ET3)

Segments ET1, ET2, and ET3 together contained 10% of the SAV in the Upper Bay zone in 1995, up from 7% in 1994 (Tables 6 and 7). This net increase in 1995 was due to a large increase of SAV in the Sassafras River (ET3) which offset decreases in the Northeast River (ET1), and the Elk and Bohemia rivers (ET2) (Tables 6 and 7). Very little SAV was mapped in segment ET1, 1.10 hectares less than in 1994 (Tables 6 and 7). Although SAV also decreased in ET2, there was an increase of SAV within the Bohemia River portion of the segment (Figure 12; Tables 6 and 7; Appendix B: Map 10). The majority of SAV in segments ET1, ET2, and ET3 continues to be classified very sparse and sparse (Figure 12; Table 8). As in 1994, principal locations of beds were along the north shore of the Elk River and in the lower Sassafras River (Figure 12; Appendix B: Maps 4, 5, 9, 10, 16, 17).

Northeast River (ET1)

SAV was mapped in ET1 in 1995, for the second time since 1987, although there were only 6.86 hectares, 14% less than in 1994 when the Tier I goal (7.54 hectares) was achieved for the first time since the aerial surveys began there in 1978 (Figure 12; Tables 6 and 7; VIMS SAV GIS Database). The SAV level in 1995 did not achieve the Tier I goal, still this was the second highest level ever recorded (Figure 12; VIMS SAV GIS Database). Nearly 100% (6.85 hectares) of the SAV was classified sparse in 1995, whereas in 1994, 75% was very sparse and 25% was moderate (Figure 12; Table 8).

Of the two beds mapped in ET1 in 1994, only the one at Cara Cove was mapped in 1995, but it expanded to 6.85 hectares from 1.99 hectares in 1994 (Figure 12; Appendix B and C: Map 4, Bed A2; Orth *et al.,* 1995). The 6 hectare, very sparse bed mapped near the head of the river in 1994 was not seen in the 1995 photography (Figure 12; Orth *et al.,* 1995). However, a small portion of a new bed was also mapped in 1995 in segment ET1 at the mouth of the river, on the western shore at Carpenter Point (Figure 12; Appendix B: Map 3; Orth *et al.,* 1995).

In 1995, *M. spicatum* and *V. americana* were reported by Stan Kollar and the Citizens' survey near

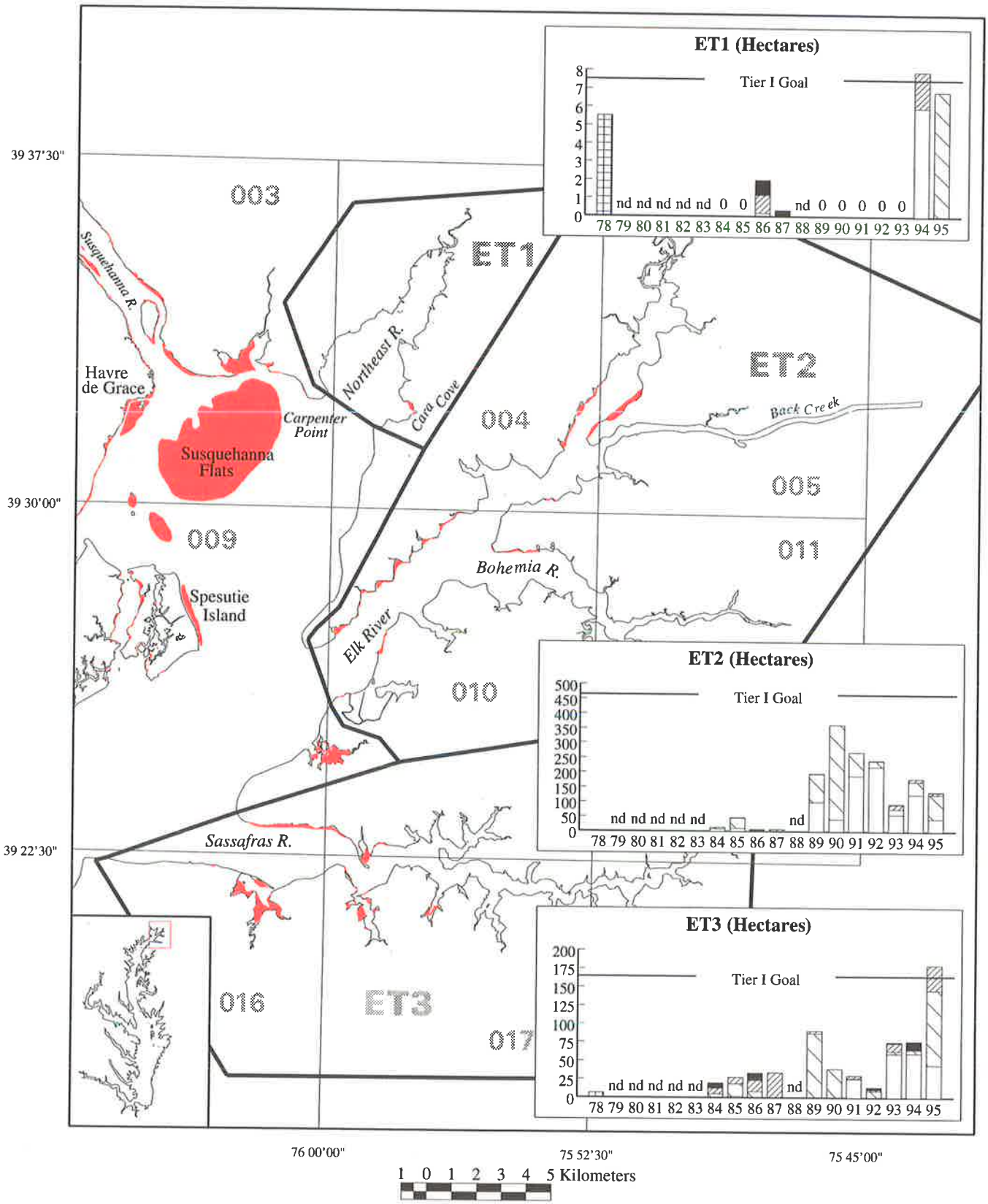

Figure 12: Distribution of SAV in the Northeast, Elk and Bohemia, and Sassafras Rivers (Segments ET1, ET2, ET3) in 1995.

the mouth of the Northeast River at Carpenter Point on the western shore, and *M. spicatum* was noted by the Citizens' survey at a site upstream (Appendices B and D: Map 3, Bed A1).

Elk and Bohemia Rivers (ET2)

SAV in ET2 decreased 24% to 136.48 hectares in 1995, from 179.86 hectares in 1994, and was still below the 465.20 hectare Tier I goal which has never been achieved in the history of the aerial survey (Figure 12; Tables 6 and 7; VIMS SAV GIS Database). However, the 1995 level is still greater than the 1993 level (94.76 hectares), the lowest level since 1987 (Figure 12; VIMS SAV GIS Database). Some beds mapped in 1994 were not seen in the 1995 photography, notably the very sparse 101.30 hectares in Piney Creek Cove on the north shore of the Elk River (Groundtruthing did, however, locate some SAV there.), accounting for a majority of the decline in ET2 from 1994 (Figure 12; Appendix B and C: Map 4; Orth *et al.,* 1995). Despite the overall decline in ET2 in 1995, SAV in the Bohemia River portion increased 87%, entirely in the one bed mapped in 1994 (1.5 hectares) and in 1995 (11.84 hectares) at the confluence with the Elk River (Figure 12; Appendices B and C: Map 10; Orth *et al.,* 1995). Compensating partially for losses elsewhere in the segment were gains in other areas of ET2, such as a 54.12 hectare gain in the Elk River above Oldfield Point, including new beds not seen in 1994 (Figure 12; Appendix B: Maps 4, 5; Orth *et al.,* 1995). Density increased in 1995 when 32% was very sparse, 60% sparse, 6% moderate, and 1% dense, whereas in 1994, 70% was very sparse, 25% sparse, 5% moderate, and 0% dense (Figure 12; Table 8).

Stan Kollar surveyed the majority of the beds mapped in ET2 in 1995, from the mouth of the Elk River, upstream to Paddy Piddle Cove near Henderson Point, noting three species: *M. spicatum, V. americana,* and *Potamogeton pectinatus* (Appendices B and D: Maps 4, 5, 10). The Citizens' survey also reported *M. spicatum* and *V. americana* in Piney Creek Cove, and *M. spicatum* at Oldfield Point (Appendices B and D: Map 4). *Myriophyllum spicatum* and *V. americana* occurred together in most of the beds; only *V. americana* was found in one bed on the western shore; only *M. spicatum* was found at Oldfield Point on the western shore, and on the eastern shore, from the mouth of the Bohemia River upstream in the Elk River to Paddy Piddle Cove; *P. pectinatus* was reported from two mixed beds on the western shore with *M. spicatum* and *V. americana* (Appendices B and D: Maps 4, 5, 10). *Potamogeton crispus* was found in 1994 on the north shore, however there were no sitings of this species in 1995 from ET2 (Appendices B and D: Maps 4, 5, 10; Orth *et al.,* 1995).

Sassafras River (ET3)

SAV in ET3 increased 136%, or 103.53 hectares, in 1995, from 76.24 hectares in 1994 to 179.77 hectares in 1995, surpassing the Tier I goal of 164.70 hectares for the first time in the history of the aerial survey (Figure 12; Tables 6 and 7; VIMS SAV GIS Database). In ET3, 25% was classified very sparse, 56% sparse, 19% moderate, and 0% dense in 1995; in 1994, 79% was very sparse, 6% sparse, 0% moderate, and 15% dense (Figure 12; Table 8; Appendix B: Maps 9, 10, 16, 17).

SAV

SAV was concentrated in the lower Sassafras River along both shores, including Money, Lloyd, Turner, and Freeman creeks (Figure 12; Appendix B: Maps 9, 10, 16, 17). Increases were due to both the expansion of beds which were present in 1994 and the addition of new beds: on the north shore, beds along Grove Neck and Money Creek expanded as well as beds on the south shore in Lloyd, Turner, and Freeman creeks; a new bed was added east of Money Creek and four were added to Turner Creek (Figure 12; Appendix B: Maps 9, 10, 16, 17; Orth *et al.,* 1995). In 1995, Stan Kollar reported *M. spicatum, C. demersum, V. americana, P. pectinatus*, and *Najas* sp. on the north shore, and *M. spicatum* and *V. americana* from the south shore, but in 1994, he reported only *M. spicatum* and *V. americana* from ET3 (Appendices B and D: Maps 9, 10, 16, 17; Orth *et al.,* 1995).

UPPER CHESAPEAKE BAY AND UPPER CENTRAL CHESAPEAKE BAY (CB2, CB3)

Upper Chesapeake Bay (CB2)

There were 81.28 hectares of SAV in 1995, the most ever mapped from the aerial survey for CB2, and a 25% increase over 65.11 hectares in 1994 (Figure 13; Tables 6 and 7). The 1995 level was still only 58% of the Tier I goal of 139.74 hectares (Figure 13; VIMS SAV GIS Database). CB2 contained 2% of the SAV in the Upper Bay zone in 1995 (Figure 13; Tables 6 and 7). Also in 1995, CB2 had the highest percentage (74%) of dense SAV ever recorded by the aerial survey, and 12% was classified moderate, 13% sparse, and 1% very sparse; contrasting with 1994 when 36% was dense, 7% moderate, 54% sparse and 4% very sparse (Figure 13; Table 8).

As in 1994, SAV was mapped from the lower Spesutie Narrows and from Little Romney and Romney creeks on the western shore, and from Pond, Still Pond, and Fairlee creeks on the eastern shore of the Bay, however, no SAV was mapped in Delph Creek in 1995 where there were two beds at the mouth in 1994 (Figure 13; Appendix B: Maps 8, 9, 10, 15; Orth *et al.,* 1995). Increases in SAV were noted in the Lower Spesutie Narrows, and in Little Romney, Fairlee, Still Pond, and Pond creeks (Figure 13; Appendix B: Maps 8, 9, 10,15). The Citizens' survey reported *M. spicatum* at one site in Worton Creek in 1995 (Appendices B and D: Map 15).

Upper Central Chesapeake Bay (CB3)

SAV in CB3 increased 4% in 1995 to 346.27 hectares, the most mapped since 1985 and 10% of the SAV in the Upper Bay zone, up from 9% (332.11 hectares) in 1994 (Figure 13; Tables 6 and 7). SAV in 1995 was at the fourth highest level since the aerial survey began, however, it was still only 41% of the Tier I goal of 845.33 hectares (Figure 13). Continuing an increasing trend for the last two years, CB3 had the largest percentage (87%) of SAV classified dense ever recorded for the segment by the aerial survey (Figure 13; Table 8; Orth *et al.,* 1995). In 1994, only 79% of the SAV in this segment was classified dense; in 1993 only 56% was classified dense (Figure 13; Table 8; Orth *et al.,* 1995). Also, in the other density classes in 1995, 6% of the SAV was classified very sparse, 3% sparse, and 4% moderate; in 1994, 1% was very sparse, 14% sparse, and 6% moderate (Figure 13; Table 8).

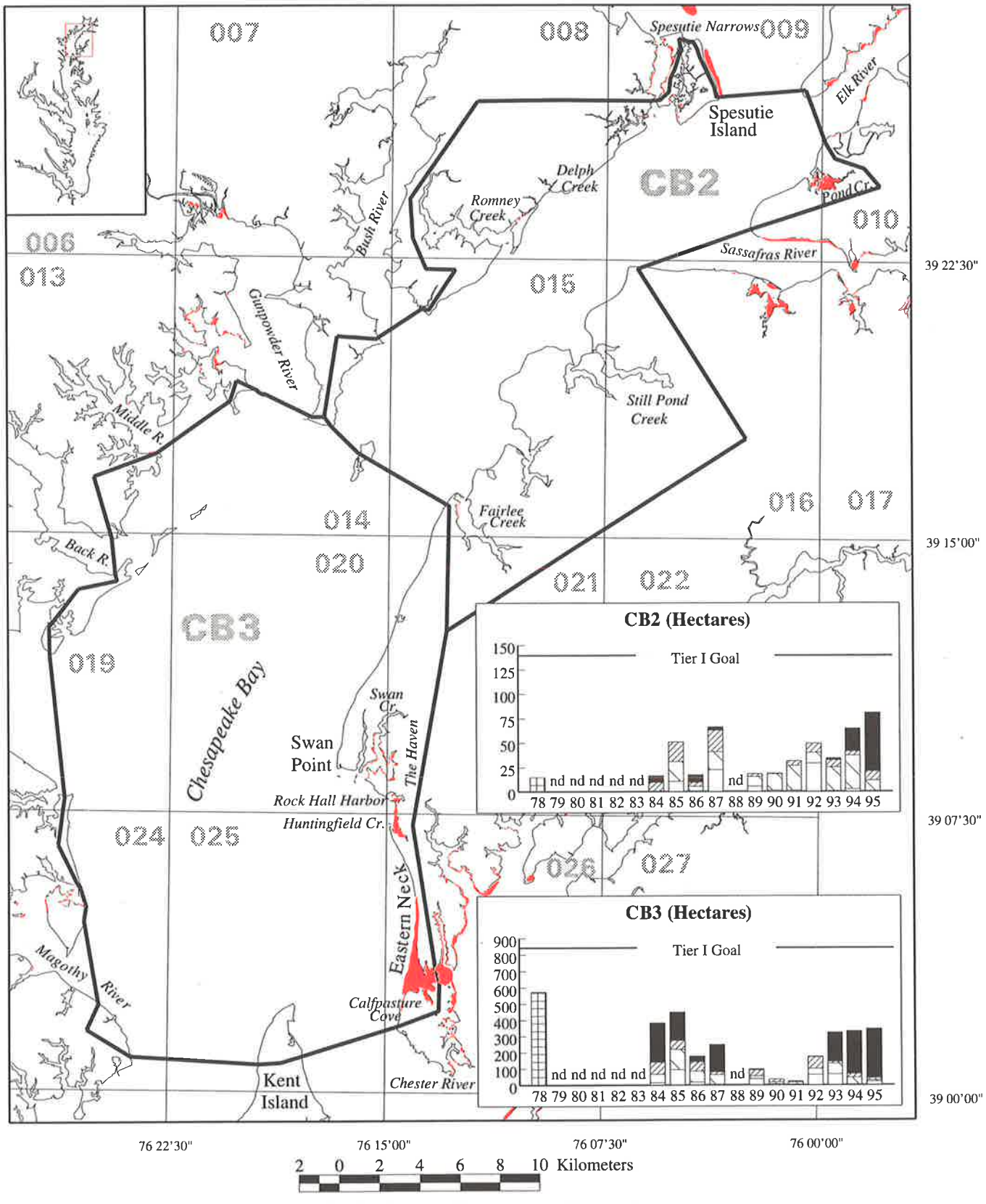

Figure 13: Distribution of SAV in the Upper Chesapeake Bay and Upper Central Chesapeake Bay (Segments CB2, CB3) in 1995.

SAV

In 1995, as in 1994, SAV was mapped only from the eastern shore of CB3: at Swan Creek, The Haven, Rock Hall Harbor, and the western shore of Eastern Neck from Huntingfield Creek in the north to Eastern Neck Island in the south; beds in those areas expanded, and a 3.32 hectare, new bed was mapped above Wickes Beach (Figure 13; Appendices B and C: Maps 20, 21, 26; Orth *et al.*, 1995).

In 1995, the Citizens' survey reported *C. demersum,* from only one site, adjacent to Black Marsh on the western shore (Appendices B and D: Map 19). In 1994, *M. spicatum* and *Zannichellia palustris* were noted from the western shore, and from the eastern shore, *Ruppia maritima*, *Potamogeton perfoliatus*, and *M. spicatum* (Orth *et al.,* 1995).

BUSH, GUNPOWDER, MIDDLE, BACK, AND PATAPSCO RIVERS (WT1, WT2, WT3, WT4, WT5)

No SAV was mapped in WT1, WT4, and WT5 in 1995, however, in WT2 and WT3, SAV was mapped, although at decreased levels from 1994 (Figure 14; Tables 6 and 7).

Bush River (WT1) and Back River (WT4)

No SAV was mapped in WT1 and WT4 in 1995, as in 1994 (Figure 14; Tables 6 and 7). SAV has never been mapped in WT4 since the aerial survey began there in 1978 (Figure 14; VIMS SAV GIS Database). WT1 had SAV mapped during only four years of the survey (1992, 1987, 1985, and 1978), but the level never reached the Tier I goal of 23.38 hectares (Figure 14; VIMS SAV GIS Database).

Dr. William Hilgartner, The Johns Hopkins University, reported *C. demersum, M. spicatum, V. americana, E. canadensis, P. crispus,* and *Potamogeton epihydrus* in Otter Point Creek in 1995 (Appendices B and D: Map 7). The first three species were reported there in 1994 (Orth *et al.,* 1995).

Patapsco River (WT5)

No SAV was mapped in WT5 during 1995, although in 1994 there was less than a hectare (Figure 14; Tables 6 and 7). SAV was mapped only once before, in 1978, and the Tier I goal (50.22 hectares) was almost achieved that year (Figure 14; VIMS SAV GIS Database).

The Citizens' survey reported *R. maritima, V. americana,* and *Z. palustris* from the sole ground-truth site for WT5 at Mt. Pleasant Beach on Stony Creek (Appendices B and D: Map 18). There was no ground-truth data reported in 1994 for WT5 (Orth *et al.,* 1995).

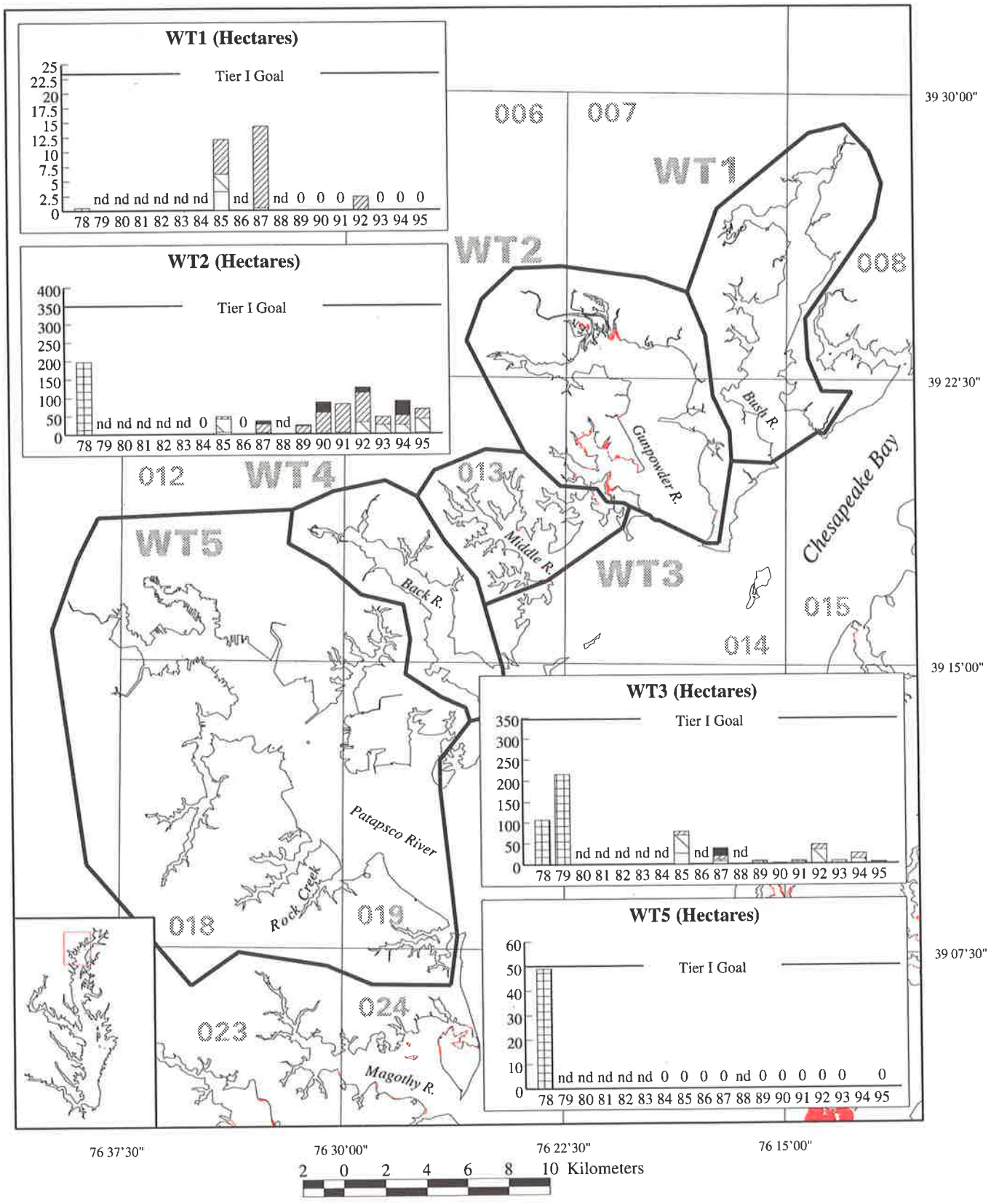

Figure 14: Distribution of SAV in the Bush, Gunpowder, Middle, Back, and Patapsco Rivers (Segments WT1, WT2, WT3, WT4, WT5) in 1995.

SAV

Gunpowder River (WT2)

WT2 had 68.25 hectares of SAV in 1995, a 24% decrease from the 89.25 hectares mapped in 1994, and about 2% of the total amount of SAV for this zone (Figure 14; Tables 6 and 7). The 1995 total is well below the ten year high of 126.08 hectares in 1992, the survey high of 196.90 hectares in 1978, and the Tier I goal of 350.54 hectares (Figure 14; VIMS SAV GIS Database). However, despite the overall decline, there was a 14.59 hectare increase at Gunpowder Falls in 1995 (Figure 14; Table 7; Appendices B and C: Map 7). SAV density also decreased in WT2 in 1995: 4% was classified very sparse, 55% sparse, 38% moderate, and 3% dense, contrasted with 1994 when 0.12% was classified very sparse, 27% was sparse, 29% was moderate, and 44% was dense (Figure 14; Table 8).

SAV in WT2 in 1995 was located at the mouth of Gunpowder Falls, at Cunninghill Cove, in Dundee and Saltpeter creeks, and near the mouth of the river south of Days Point (Figure 14; Appendix B: Maps 7, 14). In 1995, SAV increased at the mouth of Gunpowder Falls, was noticeably reduced around Carroll Island in Saltpeter and Dundee creeks, and was absent from Swaderick and Watson creeks, compared to 1994 (Figure 14; Appendix B: Maps 7, 14; Orth *et al.*, 1995).

In 1995, Stan Kollar noted *V. americana, M. spicatum, E. canadensis,* and *C. demersum* in Dundee and Saltpeter creeks, which were also reported there in 1994; the Citizens' survey reported *E. canadensis* and *V. americana* near Carroll Point (Appendices B and D: Map 14).

Middle River (WT3)

In WT3 in 1995, there were 4.76 hectares of SAV, only 0.14% of the SAV found in this zone, and an 81% decline from the 25.02 hectares mapped in 1994 (Figure 14; Tables 6 and 7). This decline follows a 18.35 hectare increase from 1993 to 1994 and is the second lowest level recorded by the aerial survey in WT3 (Figure 14; VIMS SAV GIS Database). Density declined also in 1995, 31% of the SAV was classified very sparse, 50% sparse, 19% moderate, and 0% dense, whereas in 1994, 47% was classified sparse and 53% moderate (Figure 14; Table 8). In 1995, WT3 had only five small SAV beds, in Middle River, in Seneca Creek, and in Hawthorn Cove; beds were reduced in size or absent compared to 1994 (Figure 14; Appendix B: Maps 13, 14; Orth *et al.*, 1995). There were no ground-truth data for WT3 in 1995, however, in 1994, seven species were noted: *R. maritima, M. spicatum, E. canadensis, V. americana, C. demersum, Najas guadalupensis,* and *P. perfoliatus* (Orth *et al.*, 1995).

CHESTER RIVER (ET4)

SAV in ET4 in 1995 increased 8% over that in 1994 and reached the second highest level recorded by the survey since 1978 (Figure 15; Tables 6 and 7; VIMS SAV GIS Database). There were 443.83 hectares mapped in 1995, up from the 409.50 hectares mapped in 1994, however, this level is still

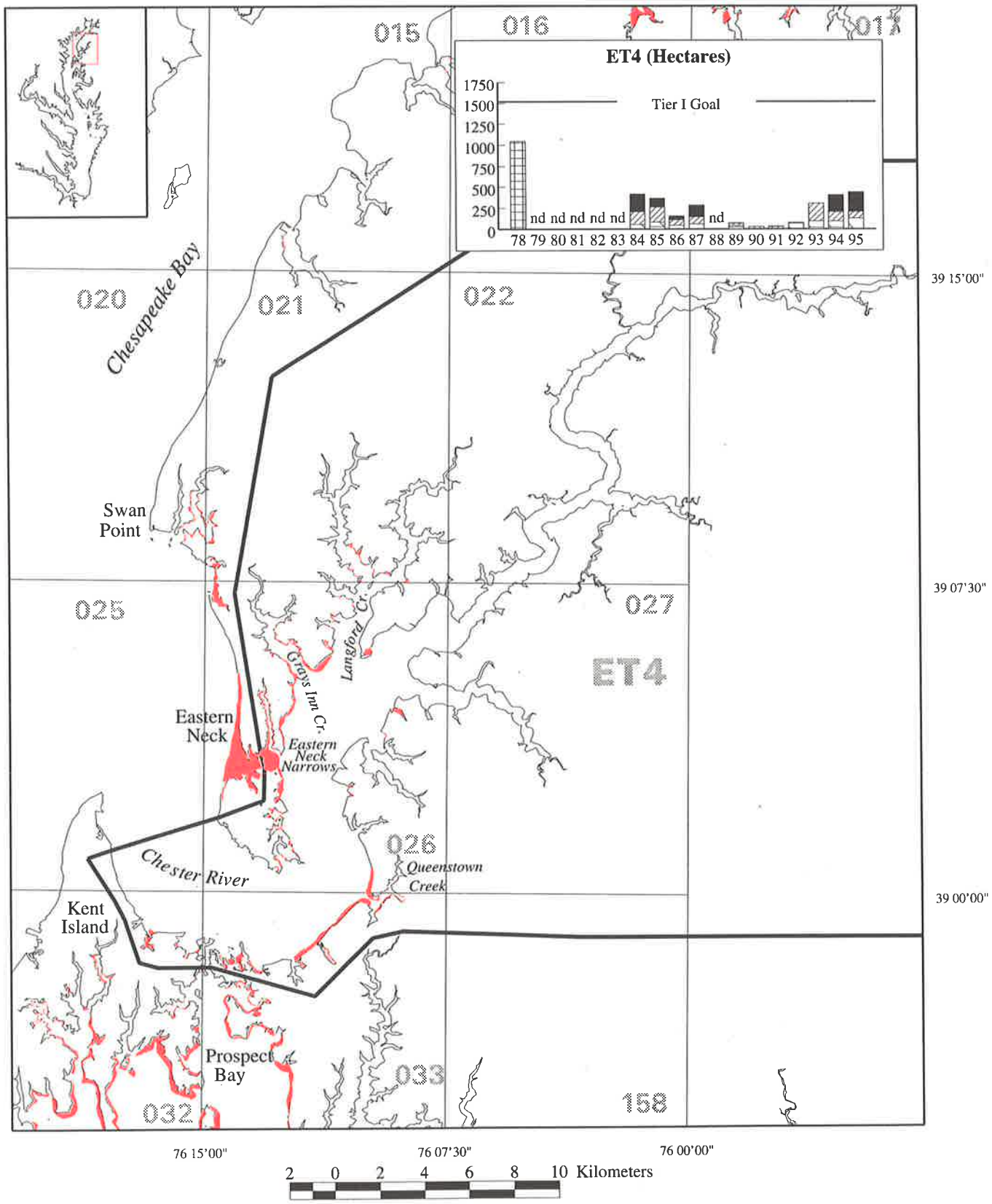

Figure 15: Distribution of SAV in the Chester River (Segment ET4) in 1995.

well below the Tier I goal of 1,517.37 hectares (Figure 15; Tables 6 and 7; VIMS SAV GIS Database). ET4 contained 13% of the SAV in the Upper Bay zone, the second most abundant segment in the zone (Tables 6 and 7). ET4 had a small increase in 1995 of SAV classified dense: 2% was classified very sparse, 28% sparse, 17% moderate, and 53% dense, whereas in 1994, 5% was classified very sparse, 18% sparse, 28% moderate, and 49% dense (Figure 15; Table 8).

Most SAV in ET4 was located adjacent to Eastern Neck and Eastern Neck Island (especially near Eastern Neck Narrows), in Church, Grays Inn, Langford, and Queenstown creeks (tributaries entering the Chester River), and the southern shore of the Chester River from Queenstown Creek to Macum Creek (Figure 15; Appendix B: Maps 21, 26, 32, 33). Even though some beds which had been present in 1994 were absent from Ringold Point, Langford Creek, Cliff and Comegys bights, and in the Corsica River, new beds appeared in the West Fork of Langford Creek, and in Grove, Herrington, Queenstown, Macum, and Piney creeks; and some beds present in 1994 expanded in 1995 (e.g. Grays Inn, Langford, Queenstown, and Jackson creeks) (Figure 15; Appendix B: Maps 21, 26, 32, 33; Orth *et al.,* 1995). There were no ground-truth data in 1995, but in 1994, the Citizens' survey cited *M. spicatum, P. perfoliatus,* and *Z. palustris* on the south shore of the Chester River (Appendices B and D: Map 33; Orth *et al.,* 1995).

MAGOTHY RIVER (WT6)

WT6 contained a total of 31.67 hectares of SAV in 1995, a 71% increase over the 1994 level of 18.54 hectares (Figure 16; Tables 6 and 7). This was the third consecutive year in WT6 that SAV was mapped in increasing amounts; the four years prior to 1993, no SAV was mapped (Figure 16; VIMS SAV GIS Database). The 1995 level was still well below both the highest level (141.27 hectares) recorded in 1978, and the Tier I goal of 236.73 hectares (Figure 16; VIMS SAV GIS Database). The density of SAV also increased in the three past years: in 1995, 2% was classified very sparse, 34% sparse, 48% moderate, and 16% dense; whereas in 1994, 7% was very sparse, 36% sparse, 47% moderate, and 10% dense; and in 1993, 95% was sparse and 5% moderate (Figure 16; Table 8; Orth *et al.,* 1995).

SAV in WT6 in 1995 was mapped in many of the same areas as in 1994: on the south shore of the Magothy River near Ulmsteads Point and South Ferry Point; and on the north shore near North Ferry Point, adjacent to Dobbins Island, along the east shore of Sillery Bay, in Cornfield Creek, and in the Magothy Narrows (Figure 16; Appendix B: Maps 23, 24). Some beds present in 1994 expanded in 1995, especially the fringing beds in the Magothy Narrows; new beds occurred at Hickory Point and by Little Island in Sillery Bay, and at the mouth of Deep Creek on the south shore (Figure 16; Appendix B: Map 24; Orth *et al.,*1995). Two beds present in 1994 were not mapped in 1995, a dense bed in James Pond and a sparse bed in Cornfield Creek, both north of the Magothy Narrows (Figure 16; Appendix B: Map 24; Orth *et al.,*1995).

Extensive groundtruthing of WT6 by the USFWS and the Citizens' survey reported *R. maritima,*

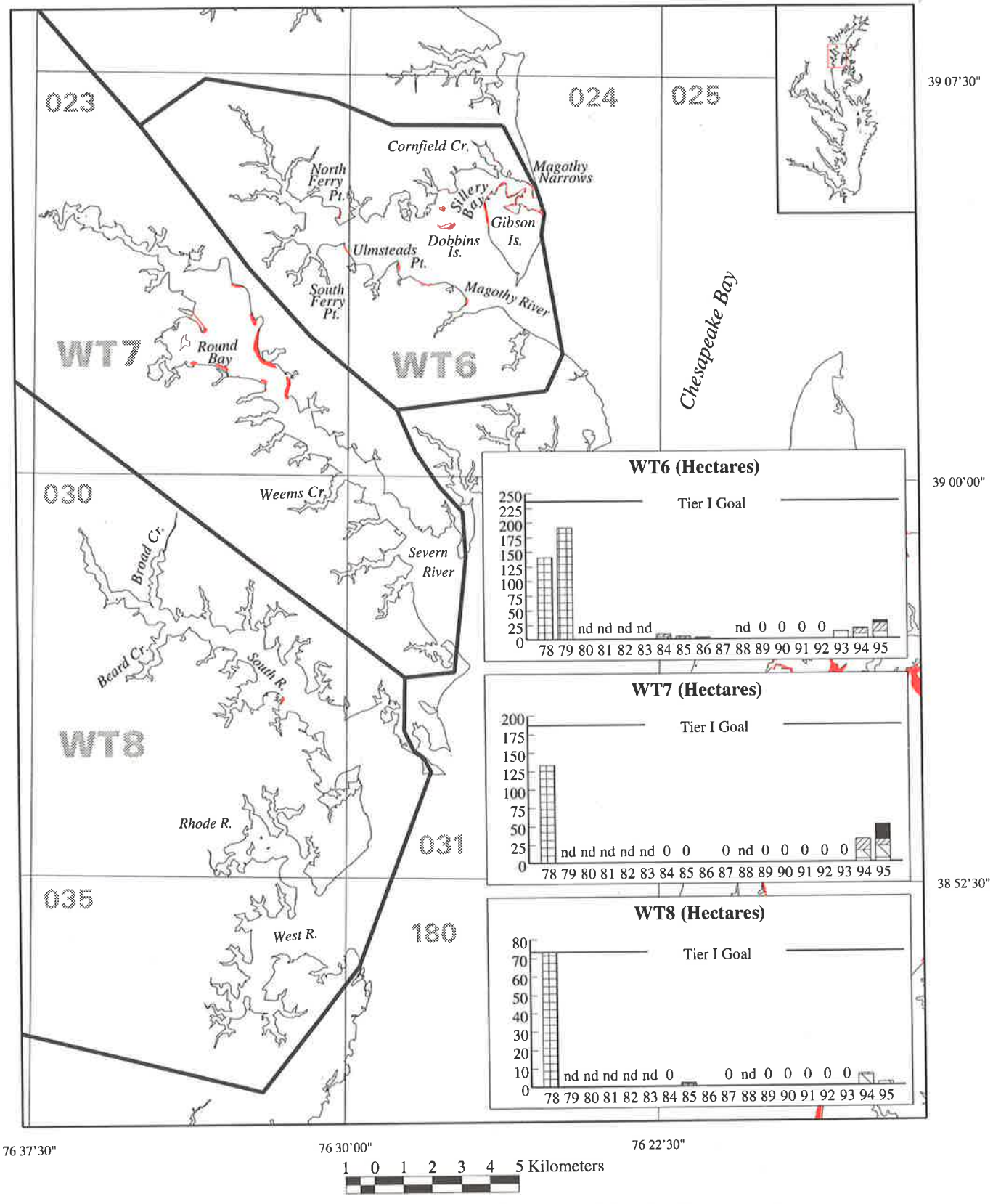

Figure 16: Distribution of SAV in the Magothy, Severn, and South, Rhode, and West Rivers (Segments WT6, WT7, WT8) in 1995.

P. perfoliatus, P. pectinatus, M. spicatum, a *Najas* species, and *Z. palustris,* the latter being by far the most frequently cited and occurring throughout the segment, from headwater tributaries to the mouth of the Magothy River (Appendices B and D: Maps 23, 24). Much less frequently cited, and with a more limited occurrence, were *R. maritima, P. perfoliatus,* and *P. pectinatus,* although the latter was seen from the headwaters (once from Old Man Creek) to the mouth occasionally, on both shorelines (Appendices B and D: Maps 23, 24). *Myriophyllum spicatum* and a *Najas* species were both cited only once, in the upper Magothy River (Appendices B and D: Maps 23, 24). Of the five species reported in 1994, *P. perfoliatus, Z. palustris, R. maritima, P. pectinatus,* and *V. americana,* only the latter was not reported in 1995 (Appendices B and D, Maps 23 and 24; Orth *et al.,* 1995).

Middle Bay Zone

SEVERN RIVER AND SOUTH, RHODE, AND WEST RIVERS (WT7, WT8)

Severn River (WT7)

There were 50.97 hectares of SAV mapped in WT7 in 1995, a 63% increase over 31.32 hectares in 1994 and the highest percentage increase in the Middle Bay Zone (Figure 16; Tables 6 and 7). However, the 1995 level was only 27% of the Tier I goal of 187.76 hectares (Figure 16; VIMS SAV GIS Database). Density increased in 1995: 41% of the SAV was classified dense, 16% moderate, 33% sparse, and 10% very sparse, in contrast to 1994 when none was classified dense, 53% was moderate, 34% sparse, and 12% very sparse (Figure 16; Table 8). SAV beds were mapped in the mainstem Severn River from Round Bay downstream to Joyce, as in 1994, with new beds at the mouths of Round Bay, Brewer Creek, and Ringold Cove (Figure 16; Appendix B: Maps 23).

The Citizens' survey and the USFWS reported *Potamogeton pusillus, P. perfoliatus, R. maritima,* and *Z. palustris,* the latter two cited most frequently, the latter three noted from Round Bay to Joyce, primarily in the area of the mapped SAV beds, and also in Weems and College creeks at Annapolis (Appendices B and D: Maps 23, 30, 31). There was one report of *P. pusillus* with *Z. palustris* in Lake Ogleton at the mouth of the Severn River where an unidentified species and *Z. palustris* were reported in 1994 (Appendices B and D: Map 31; Orth *et al.,* 1995). Also in 1994, *R. maritima, P. perfoliatus,* and *Z. palustris* were reported from WT7 (Orth *et al.,* 1995).

South, Rhode, and West Rivers (WT8)

In WT8 in 1995, SAV was mapped in only one sparse bed in the South River, a total of 1.83 hectares and a 71% decline from the 6.36 hectares in 1994 (Figure 16; Tables 6 and 7; Appendix B: Map 30). The 1995 level was far below the Tier I goal of 73.24 hectares (Figure 16; VIMS SAV GIS

Database). There was also a decline in density in 1995 in WT8: 100% of the SAV was classified sparse in 1995 compared to 1994 when 86% was sparse and 14% was moderate (Figure 16; Table 8). No SAV was mapped in the Rhode River in 1995, as in 1994, or in the West River where two small, sparse beds were mapped at the mouth in 1994 (Figure 16; Appendix B: Maps 30, 35; Orth *et al.,* 1995). Of the two beds mapped in the South River in 1994, there was an expansion of the bed at the mouth of Brewer Creek in 1995, and the other bed at the mouth of Aberdeen Creek was not mapped in 1995, although *Z. palustris* and *R. maritima* were noted there by the Citizens' survey (Figure 16; Appendices B and D: Map 30; Orth *et al.,* 1995). In the South River, an extensive survey by the Citizens reported four species: *P. crispus, P. pusillus, Z. palustris,* and *R. maritima,* the latter two cited most frequently (Appendices B and D: Map 30). *Potamogeton pusillus* was reported only in Ramsay Lake, and *P. crispus* only in Crab Creek, but *Z. palustris* and *R. maritima* were reported in the mainstem and in creeks, from headwater tributaries downstream to Turkey Point on the south shore and Hill Point on the north shore (Appendices B and D: Map 30). The Citizens' survey reported *R. maritima* from one site in the West River (Appendices B and D: Map 35). In 1994, the Citizens' survey found *Z. palustris* and *R. maritima* at numerous locations in the South and Rhode rivers, and unidentified species were also reported once in both rivers and at the mouth of the Rhode River (Orth *et al.,* 1995).

EASTERN BAY (EE1)

In EE1, there were 1,347.05 hectares of SAV mapped in 1995, an 38% increase over the 976.14 hectares in 1994 (Figure 17; Tables 6 and 7). This is the largest increase in hectares for any segment in the Middle Bay zone as well as in the Chesapeake Bay (Table 6). SAV has steadily increased each year in the Eastern Bay segment since the 1991 low level of 67.93 hectares (Figure 17; Orth *et al.,* 1995). In particular, the SAV on the Kent Island quadrangle (Map 32) portion of EE1 more than doubled from the 1994 level of 252.32 hectares, to 511.79 hectares in 1995 (Table 7; Appendix B). The number of hectares in EE1 represented 11% of the SAV in the Middle Bay zone in 1995 and 54% of the Tier I goal of 2,516.52 hectares (Figure 17; Tables 6 and 7; VIMS SAV GIS Database). SAV in all of the quadrangles in EE1 increased over 1994 levels (Table 7). Dense SAV increased, however, but so did sparse and very sparse SAV, in EE1 in 1995: 16% was classified dense, 20% was moderate, 52% sparse, and 13% very sparse compared to 4% dense, 36% moderate, 49% sparse, and 11% very sparse in 1994 (Figure 17; Table 8).

SAV in EE1 was mapped in: the lower Miles and Wye rivers; Cox Creek; Prospect and Crab Alley bays; adjacent to Parson Island and Piney Neck; and Eastern Bay, between Ferry Cove and Tilghman Point, and along the eastern side of Kent Island (Figure 17; Appendix B: Maps 32, 33, 36, 37). New beds appeared: in Cox and Tanners creeks; adjacent to Philpots Island; and at Hood and Piney points in 1995 (Figure 17; Appendix B: Maps 32, 33, 36). In 1995, there was only one ground-truth site reported for EE1: the Citizens' survey reported *R. maritima* in the area of Hood Point in

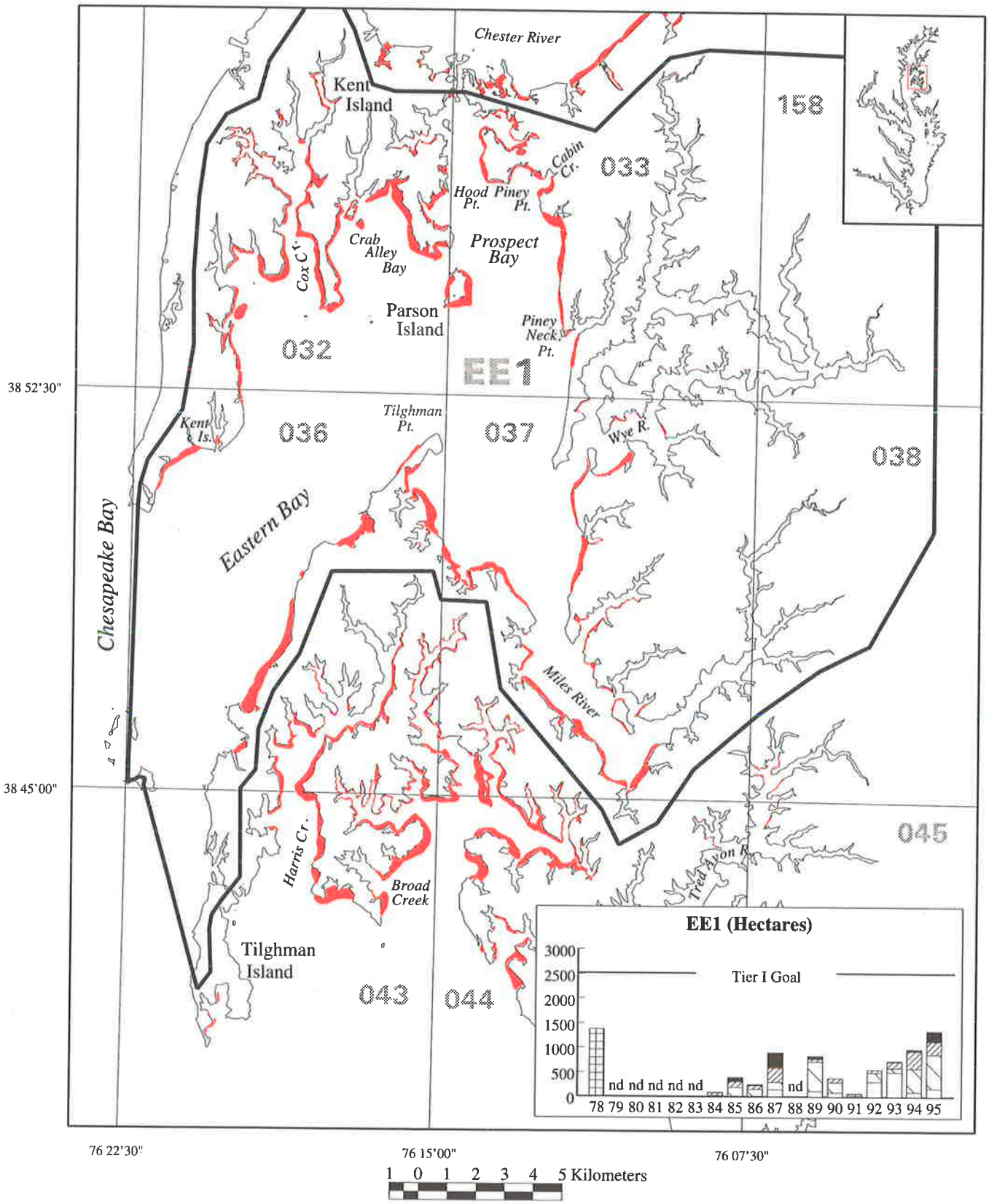

Figure 17: Distribution of SAV in the Eastern Bay (Segment EE1) in 1995.

Prospect Bay (Appendices B and D: Map 33). In 1994, *R. maritima* and *Z. palustris* were reported from EE1, and *Zostera marina* was erroneously reported (Orth *et al.,* 1995).

MIDDLE CENTRAL CHESAPEAKE BAY (CB4)

In CB4, there was no SAV mapped in 1995, as in 1994 (Figure 18; Tables 6 and 7). There were no ground-truth data reported for CB4 in 1995, however there were ground-truth data for 1994: *Z. palustris* was reported from two creeks flowing into CB4, in the area of the western shore between the mouths of the Severn and South rivers (Orth *et al.,* 1995).

CHOPTANK RIVER AND LOWER CHOPTANK RIVER (ET5, EE2)

Choptank River (ET5)

No SAV was mapped in ET5 in 1995, nor were there any ground-truth data, as in 1994 (Figure 19; Tables 6 and 7; Orth *et al.,* 1995).

Lower Choptank River (EE2)

In EE2 in 1995, there were 1,498.08 hectares mapped, compared to 1,513.61 hectares in 1994, a decrease of 1.03% (15.53 hectares), and 42% of the Tier I goal of 3,597.03 hectares (Figure 19; Tables 6 and 7; VIMS SAV GIS Database). EE2 contained 12% of the SAV in this zone in 1995 (Tables 6 and 7). There was an overall decline in density compared to 1994: 28% of the SAV was classified dense in 1995, 31% was moderate, 34% sparse, and 7% very sparse, compared to 42% dense, 31% moderate, 26% sparse, and 1% very sparse in 1994 (Figure 19; Table 8).

Five of the nine quadrangles in EE2 declined from 1994 levels (Figure 19; Tables 6 and 7). SAV was reduced in Harris Creek, especially in the Northeast Branch, and in Cummings and Broad creeks (Figure 19; Appendix B: Map 36). On the Tilghman quadrangle, SAV decreased in Blackwalnut and Dun coves, and near Bald Eagle and Change points (Figure 19; Appendix B: Map 43). Only two beds remain in Oyster Cove; the vegetation which was present in Cators, Hooper, and Chapel coves, and Slaughter Creek in 1994, was no longer present in 1995 (Figure 19; Appendix B: Map 62; Orth *et al.,* 1995). SAV also decreased in Irish Creek, and was absent from Haskins Cove and Foxhole Creek. (Figure 19; Appendix B: Map 44). Several new beds were mapped in 1995 in EE2. For the first time in ten years, SAV was detected by aerial photography on Map 38 in the Tred Avon River (Figure 19; Appendix B; VIMS SAV GIS Database). New beds were also noted: in Maxmore, Trippe, Island, Peachblossom, and Brooks creeks; in Flatty and Hills Point coves; and in the Tred Avon River (Figure 19; Appendix B: Maps 44, 45, 51). Other increases occurred at Hambleton

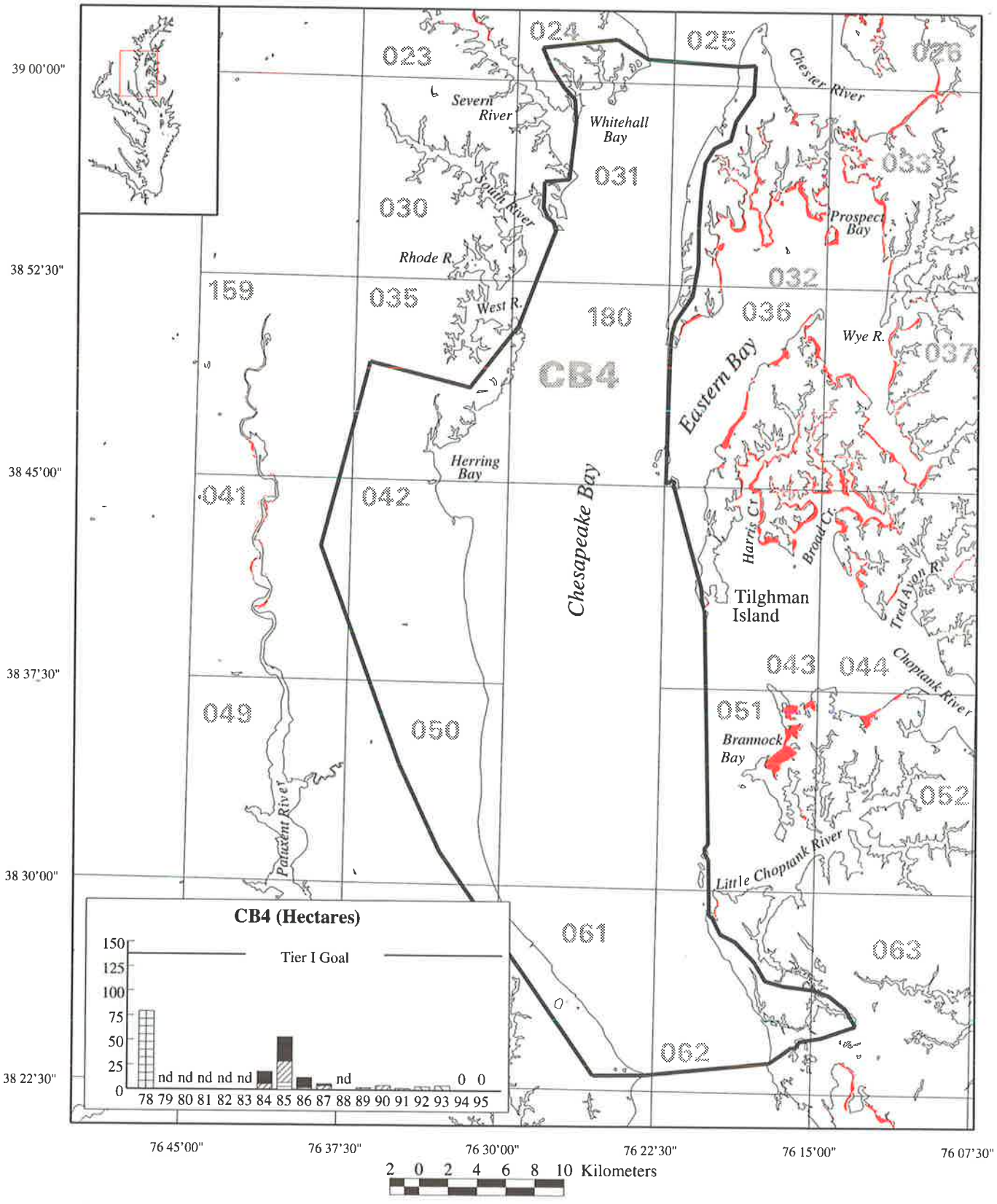

Figure 18: Distribution of SAV in the Middle Central Chesapeake Bay (Segment CB4) in 1995.

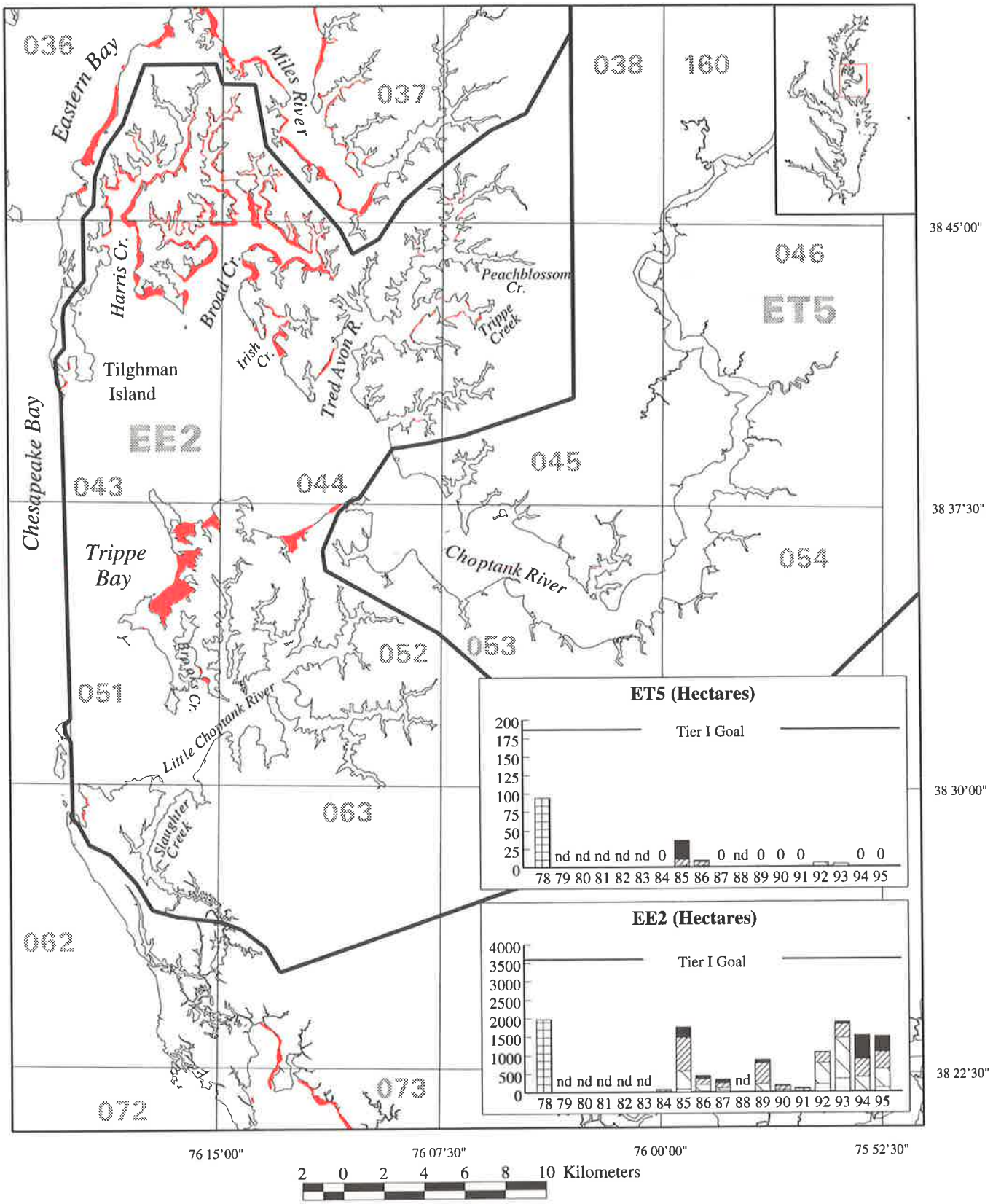

Figure 19: Distribution of SAV in the Choptank River (Segments EE2, ET5) in 1995.

Island, Turkey Neck Point, Covey Creek, and at Brannock Bay (Figure 19; Appendix B: Maps 43, 44, 51).

In 1995, the Citizens' survey reported sitings of *R. maritima* in the area of Hambleton Island and in Broad Creek (Appendices B and D: Maps 37, 43). The Citizens' survey also reported *R. maritima* and *P. pectinatus* in the area of Fox Hole Creek off of the Tred Avon River (Appendices B and D: Map 44). *Ruppia maritima* was also noted by the Citizens' survey in the area of Trippe Bay with an unidentified species (Appendices B and D: Map 51). The Citizens' survey reported several sitings of an unidentified species in Irish Creek off of the Choptank River (Appendices B and D: Map 44). *Zannichellia palustris* was also noted by the Citizens' survey in Boone Creek on Oxford Neck (Map 44) and in Back Creek off of the Little Choptank River (Map 52) (Appendices B and D). In 1994, only *R. maritima* and *Z. palustris* were reported from EE2 (Orth *et al.*, 1995).

PATUXENT RIVER (LE1, RET1, TF1)

In the Patuxent River (LE1, RET1, TF1) there was a decrease of 1.58 hectares reported in 1995, mainly in RET1, and LE1 remained unvegetated (Figure 20; Tables 6 and 7).

Upper Patuxent River (TF1)

In TF1 there were 75.13 hectares mapped in 1995, similar to 75.19 hectares mapped in 1994, exceeding the Tier I goal of 6.47 hectares (Figure 20; Tables 6 and 7; VIMS SAV GIS Database). However, density declined: 45% was classified dense, 36% was moderate, and 19% was sparse in 1995, compared to 82% dense and 18% moderate in 1994 (Figure 20; Table 8). The SAV beds were located below Waysons Corner (Route 4 Bridge) to North Lower Marlboro (Figure 20; Appendix B: Map 159). In 1995, the Patuxent River Park staff reported *H. verticillata, N. guadalupensis, C. demersum, P. pusillus, E. canadensis, V. americana, P. crispus,* and *N. gracillima;* and the Citizens' survey reported *P. crispus, C. demersum, E. canadensis, Najas flexilis, N. minor,* and an unidentified *Najas* species (Appendices B and D: Maps 41, 49, 159). In 1994, all the above species were reported in addition to *Z. palustris* and an unidentified species (Orth *et al.*, 1995).

Middle Patuxent River (RET1)

In 1995 in RET1, no SAV was mapped, in contrast to the 1.52 hectares mapped in 1994, in Swanson Creek (Figure 20; Tables 6 and 7; Orth *et al.*, 1995). There was no ground-truth information for RET1 in 1994, but in 1995 the Patuxent River Park survey noted *E. canadensis* and an unknown species in Swanson Creek, very near the place where an SAV bed was mapped in 1994 (Appendices B and D: Map 49; Orth *et al.*, 1995).

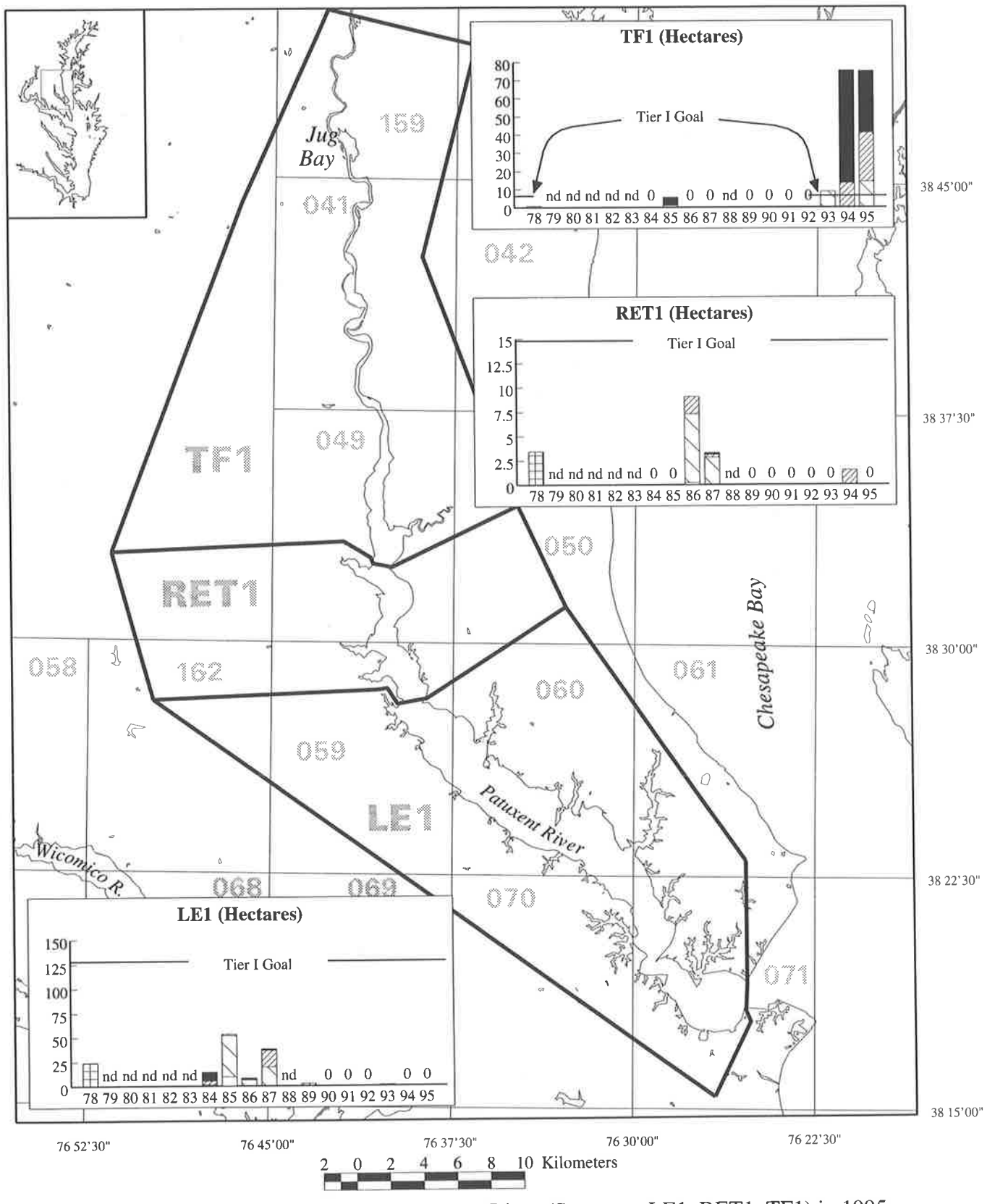

Figure 20: Distribution of SAV in the Patuxent River (Segments LE1, RET1, TF1) in 1995.

SAV

Lower Patuxent River (LE1)

In LE1, no SAV was mapped in 1995, as in 1994 (Figure 20; Tables 6 and 7). In 1995, the Citizens' survey reported *Z. palustris* in Long Cove and Battle Creek, in Cuckold Creek and tributaries, and in Saint Leonard Creek (Appendices B and D: Maps 60, 61, 70). There was also a report of *Z. palustris* in Osborn Cove of Saint Leonards Creek by the USEPA (Appendices B and D: Map 61). In 1994, *Z. palustris, R. maritima, M. spicatum, P. pectinatus,* and *V. americana* were reported from LE1 (Orth *et al.,* 1995).

NANTICOKE, WICOMICO, MANOKIN, BIG ANNEMESSEX, AND POCOMOKE RIVERS (ET6, ET7, ET8, ET9, ET10)

Nanticoke River (ET6), Wicomico River (ET7), and Pocomoke River (ET10).

No SAV was mapped in ET6, ET7, or ET10 in 1995 (Figure 21; Tables 6 and 7). None of these segments ever had SAV mapped in the history of the aerial survey (VIMS SAV GIS Database). There were also no ground-truth data reported for ET6, ET7, and ET10 in 1995, as in 1994 (Appendix B and D: Maps 84, 85, Orth *et al.,* 1995).

Manokin River (ET8) and Big Annemessex River (ET9)

SAV increased 40% in ET8, to 93.37 hectares in 1995, from 66.63 hectares mapped in 1994 (Figure 21; Tables 6 and 7). The 1995 level did not meet the Tier I goal of 274.96 hectares (Figure 21; VIMS SAV GIS Database). SAV density also increased in 1995: no SAV was classified very sparse, for either 1994 or 1995; 46% was classified sparse, compared to 77% in 1994; 45% was moderate, compared to 23% in 1994; and 9% was dense, compared to 0% in 1994 (Figure 21; Table 8). Increases occurred around Little Deal Island, Laws Thorofare, and Drum Point Cove (Figure 21; Appendix B: Maps 84, 92, 93). SAV was also mapped in Teaque and Geanquakin creeks, both of which had no SAV in 1994 (Figure 21; Appendix B: Maps 85, 93; Orth *et al.,* 1995). However, SAV did decrease in the Monie quadrangle (Map 85), in Broad Creek, from 5.58 hectares in 1994, to 4.21 hectares in 1995 (Figure 21; Table 7; Appendix B; Orth *et al.,* 1995). *Ruppia maritima* was reported in ET8 by the Citizens' survey at a site in Laws Thorofare on the north shore of the Manokin River, as in 1994, and by VIMS in Mine Creek on the south shore (Appendices B and D: Maps 84, 93).

ET9 had a total of 179.76 hectares of SAV in 1995, compared to 161.79 hectares mapped in 1994 (Figure 21; Tables 6 and 7). This is an 11% increase in 1995 for ET9 and 49% of the Tier I goal of 364.40 hectares (Figure 21; Tables 6 and 7; VIMS SAV GIS Database). Density increased in 1995 in ET9: 12% of the SAV was classified very sparse, compared to 0% in 1994; 27% was sparse, compared to 34% in 1994; 15% was moderate, compared to 66% in 1994; and 47% was dense, compared to 0% in 1994 (Figure 21; Table 8). Increases in SAV occurred along the Big Annemessex

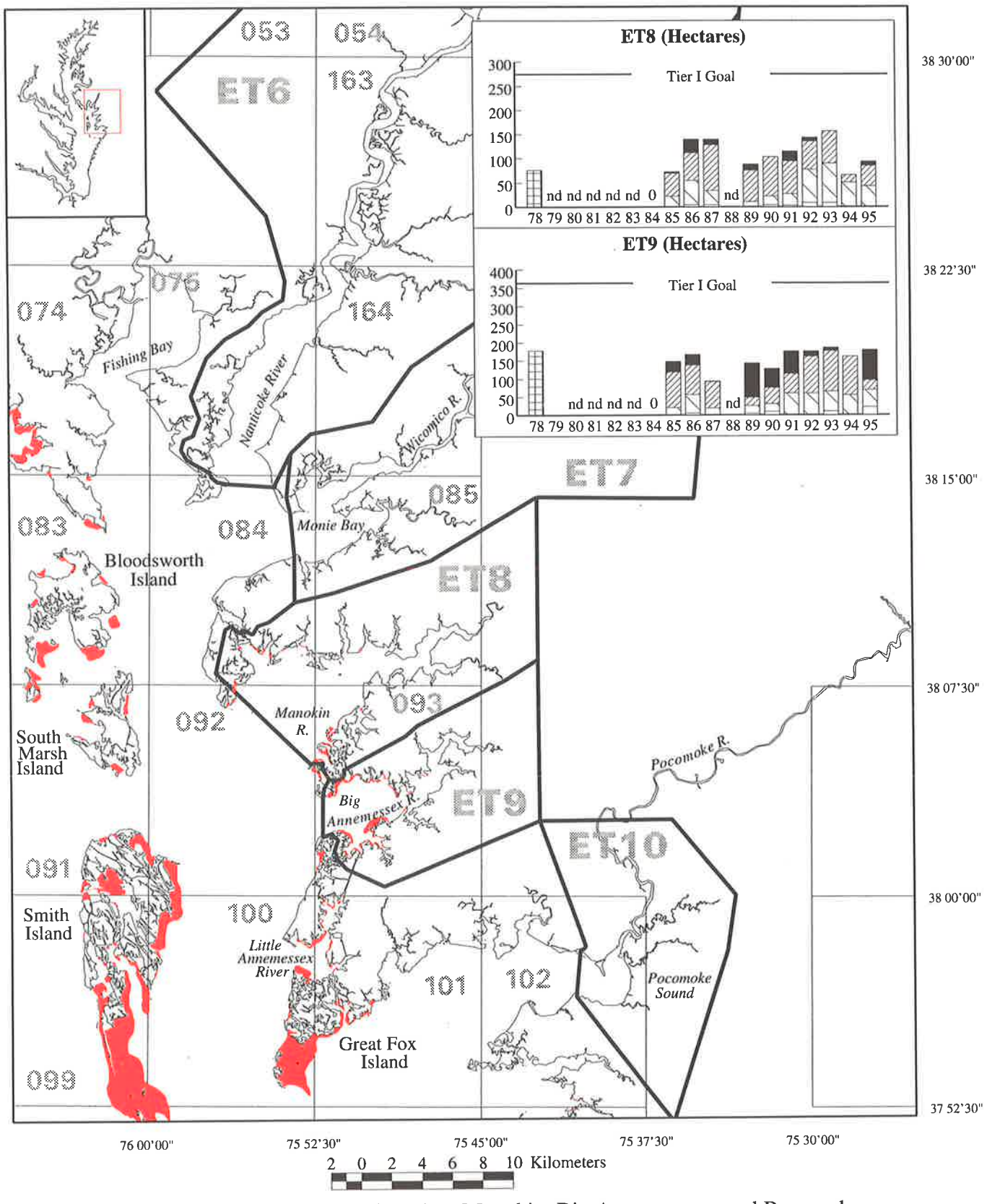

Figure 21: SAV in the Nanticoke, Wicomico, Manokin, Big Annemessex, and Pocomoke Rivers (ET6, ET7, ET8, ET9, ET10) in 1995. ET6, ET7, and ET10 are not graphed as no SAV beds were mapped from 1971– 1995.

River around Red Hole, Rock Hole, and Mine Cove (Figure 21; Appendix B: Map 93). There were no ground-truth data reported for ET9 in 1995, as in 1994 (Appendices B and D).

TANGIER SOUND (EE3)

SAV in EE3 decreased in 1995 for the second consecutive year (Figure 22; Tables 6 and 7; Orth *et al.,* 1995). The 1995 level was 63% of the Tier I goal of 6,419.51 hectares (Figure 22; VIMS SAV GIS Database). SAV decreased 11% or 525.67 hectares in EE3, from 4,575.39 hectares in 1994, to 4,049.72 hectares in 1995; while in 1994, SAV decreased 24% or 1,440.20 hectares from the 1993 level (Figure 22; Tables 6 and 7; Orth *et al.,* 1995). Yet despite the 11% decrease in 1995, SAV in EE3 accounted for 33% of the Middle Bay zone total, similar to 34% in 1994 (Figure 22; Tables 6 and 7). In 1995 in segment EE3, SAV decreased in eight quadrangles (Maps 63, 73, 74, 82, 91, 107, 108, and 109), increased (a total of 68.52 hectares) in eight (Maps 83, 84, 92, 93, 99, 100, 101, and 102), and remained without SAV mapped in two (Maps 62 and 75); whereas in 1994, SAV decreased in sixteen of the quadrangles (the eight which decreased in 1995 plus the eight which increased in 1995), increased in none, and remained without SAV mapped in two (Maps 62 and 75) (Table 7; Appendix B; Orth *et al.,* 1995). One quadrangle (Map 82) which had SAV mapped (4.24 hectares) in EE3 in 1994, had no SAV mapped in 1995 (Tables 6 and 7; Appendix B; Orth *et al.,* 1995). Map 102, with no SAV mapped in EE3 in 1994, had an increase to 2.53 hectares SAV in 1995, similar to its 2.10 hectare level in 1993 (Tables 6 and 7; Appendix B; Orth *et al.,* 1995).

As in 1994, a majority of the decline in distribution in EE3 occurred in the Honga River, where SAV beds continued to exist although decreased in number and extent: on the western shore along Meekins Neck (Maps 63 and 73), Upper Hooper Island (Map 73), and Middle Hooper Island (Maps 73 and 82); and on the eastern shore along Keenes Point, Wallace and Charles creeks, Wroten and Asquith islands (Map 73), and Fallins, Norman, and Hopkins coves (Maps 74 and 83) (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS noted *R. maritima* at several sites on the eastern shore of the Honga River from Kirwan Neck to Hopkins Cove (Appendices B and D: Maps 73, 74, 83). *Zostera marina* was reported by VIMS from Muddy Hook Cove on Middle Hooper Island, on the western shore of the Honga River (Appendices B and D: Map 73).

SAV in the Bloodsworth Island quadrangle (Map 83), increased in EE3, from 204.29 hectares in 1994, to 257.09 hectares in 1995, and had a notable increase of SAV detected in Great Cove where none was mapped in 1994 (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported *R. maritima* from the south end of Bloodsworth Island (Appendices B and D: Map 83).

In the Kedges Straits quadrangle (Map 91), SAV decreased in EE3, from 175.22 hectares in 1994, to 155.42 hectares in 1995, mainly around South Marsh Island in Pungers Cove, Pungers Creek, Sheepshead Harbor, and Muscle Hole, and around Smith Island in Back Cove (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported *R. maritima* from the bed in Pungers Cove

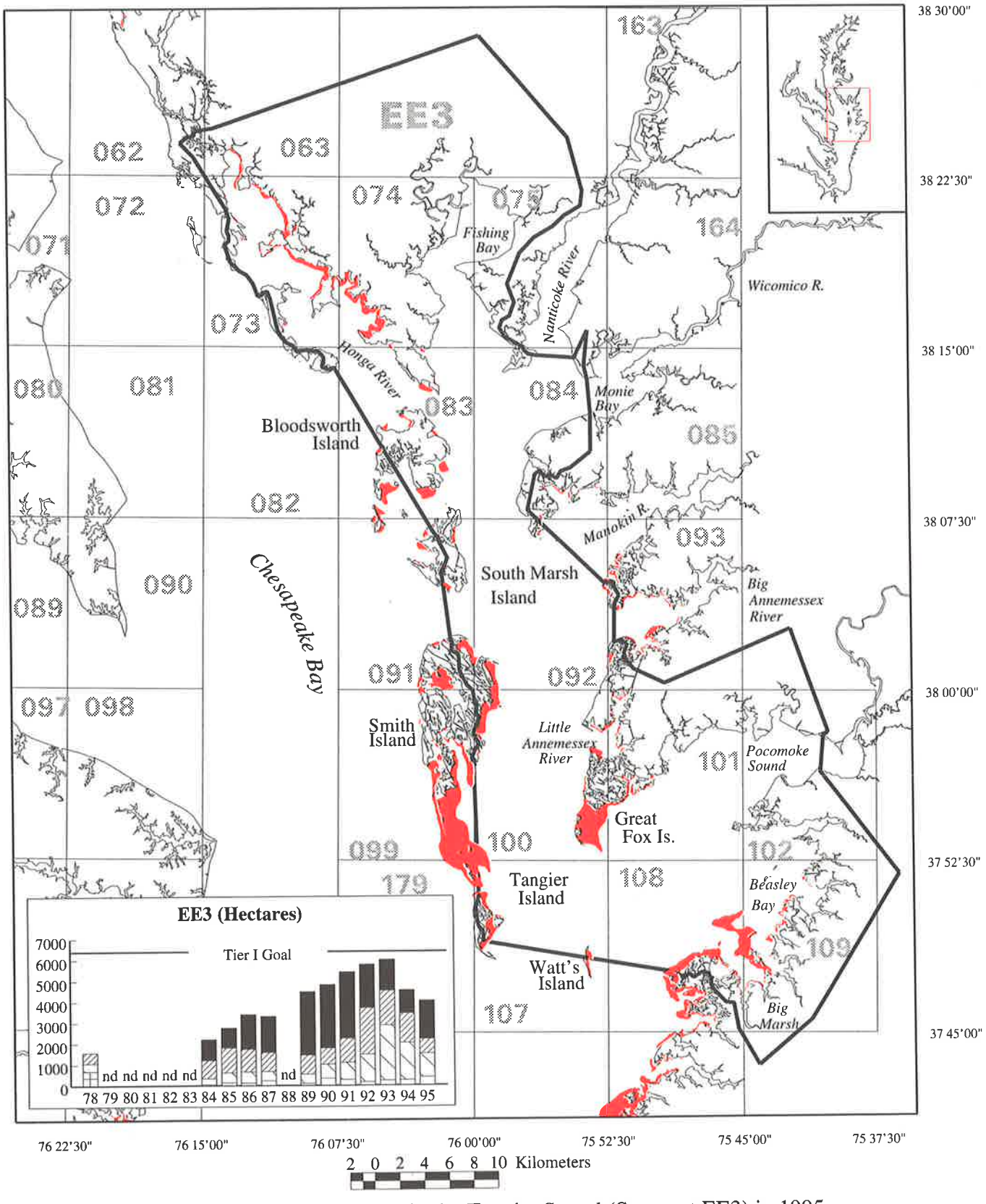

Figure 22: Distribution of SAV in the Tangier Sound (Segment EE3) in 1995.

(Appendices B and D: Map 91). SAV in EE3 in the Terrapin Sand Point quadrangle (Map 92), which contains the northeast corner of Smith Island (as well as the mouth of the Manokin River), remained essentially the same as in 1994, with beds in all the same sites and with only a 4.06 hectare increase (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). SAV in the small portion of EE3 on Map 99 (Ewell) increased 0.56 hectares in 1995 in the area of Tyler Creek on Smith Island (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). SAV in EE3 on Map 100, Great Fox Island quadrangle, increased only 6.25 hectares, however, it continues to have the largest amount (1,126.80 hectares or 28%) of SAV in EE3 (Figure 22; Tables 6 and 7). There were some declines in SAV beds on Map 100 in EE3, mainly around Cedar and Janes islands on the eastern side and, on the western side, in the Big Thorofare on Smith Island; but two new beds also appeared on south Smith Island (Figure 22; Appendix B; Orth *et al.,* 1995). VIMS reported both *R. maritima* and *Z. marina* from the eastern and western shores of Tangier Sound on Map 100: both species were reported from Smith Island and Great Fox Island; only *R. maritima* was reported from the south end of Janes Island at the mouth of the Little Annemessex River (Appendices B and D: Map 100).

In the Tangier Island quadrangle (Map 107), SAV decreased in EE3 from 353.30 hectares in 1994, to 330.14 hectares in 1995, mainly in the area of Queen Ridge off Goose Island; however, beds north of West Point on Tangier Island increased in size and density, while the bed on the east shore of Watts Island persisted (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported both *R. maritima* and *Z. marina* from Tangier Island beds (Appendices B and D: Map 107).

In the Chesconnessex quadrangle (Map 108), SAV decreased in EE3 from 568.88 hectares in 1994, to 545.68 hectares in 1995, mainly in the area of Big Marsh, while the contiguous beds north of Scott Island remained essentially the same (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported both *R. maritima* and *Z. marina* from Big Marsh, and only *Z. marina* from the large contiguous beds north of Scott Island (Appendices B and D: Map 108). SAV in the Parksley quadrangle (Map 109), immediately to the east of Map 108, decreased from 407.32 hectares in 1994, to 390.29 hectares in 1995: the large contiguous SAV beds around Halfmoon and Webb islands persisted but decreased somewhat, especially in Hunting and Doe creeks, and they also decreased in density in some areas; some SAV beds mapped on the eastern shore of Map 109 in 1994 were either decreased in size or not mapped in 1995, especially around Upper Bernard Island and Little Back, Hunting, and Deep creeks, while others were either increased or newly mapped, especially around Byrds Marsh, and Simpson and Peters points (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported *Z. marina* and *R. maritima* from The Thorofare by Webb Island, and only *Z. marina* at Halfmoon Island (Appendices B and D: Map 109).

Immediately above Byrds Marsh, there were beds mapped (2.53 hectares) in Cattail Creek in 1995 on Map 102, the Saxis quadrangle, which had no SAV in 1994 but had SAV in 1993; however, the rest of Map 102, which includes the eastern portion of Pocomoke Sound, was devoid of SAV (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported both *R. maritima* and *Z. marina* from Cattail Creek; only *R. maritima* was reported by VIMS at Michael Marsh, north of Cattail

Creek (Appendices B and D: Map 102). SAV in EE3 in Map 101, the Crisfield quadrangle, immediately west of Map 102, increased only 0.69 hectares in 1995, from 179.13 hectares in 1994 (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). The western portion of Pocomoke Sound in EE3 on Map 101 was also devoid of SAV east of Ware Point at the mouth of Ape Hole Creek; but west of the latter point, SAV beds were present essentially as they were in 1994, although somewhat increased in size, along Oystershell Point, Eastward Point, Broad Creek, and Cedar Island (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). VIMS reported *R. maritima* in Broad Creek (Appendices B and D: Map 101). In the Little Annemessex River and its tributaries (including Daugherty Creek), north of Broad Creek on Map 101, the SAV beds mapped in 1995 were essentially the same as in 1994 except for: some expansions of beds; five small beds which were newly mapped; and three small beds present in 1994 which were not mapped in 1995 (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). Both *R. maritima* and *Z. marina* were reported by VIMS from the Little Annemessex River area (Appendices B and D: Map 101).

SAV in the portion of EE3 on Map 93, the Marion quadrangle, increased from 29.91 hectares in 1994 to 31.50 hectares in 1995, with new beds in Daugherty Creek (as on the adjacent Map 101 portion of Daugherty Creek) and other beds increased in size at Janes and Hazard islands at the mouth of the Big Annesmessex River (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995).

SAV in the portion of EE3 on Map 84, the Deal Island quadrangle, increased from 0.21 hectares in 1994 to 0.25 hectares in 1995, in the one small bed mapped both years at the north end of Little Deal Island in the mouth of the Manokin River; otherwise, the rest of EE3 on Map 84 was devoid of SAV (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995). Map 92, which was previously discussed above, had other beds mapped in EE3 at the mouth of the Manokin River, at the south end of Little Deal Island and in Hazard Cove (Figure 22; Table 7; Appendix B; Orth *et al.,* 1995).

Also, despite the decrease in distribution, the percentage of SAV classified dense increased from 24% in 1994, to 45% in 1995, the highest level since 1991 when 59% was classified dense (Figure 22; Table 8; Orth *et al.,* 1995). However, the moderate category declined to 17% in 1995, from 31% in 1994; and 10% of the SAV was classified very sparse, 28% sparse, compared with 1994 when 5% was classified very sparse, 39% sparse (Figure 22; Table 8; Orth *et al.,* 1995).

In 1994 in EE3, VIMS only reported *R. maritima* in the Honga River (Orth *et al.,* 1995).

POTOMAC RIVER (LE2, RET2, TF2)

SAV in 1995 in the Potomac River as a whole (segments LE2, RET2, and TF2 combined) continued to decline from the peak of 3,595 hectares in 1991, which followed six years of increases since 1984 (Figures 23 and 24; Tables 6 and 7; VIMS SAV GIS Database; Orth *et al.*, 1995). The total abundance of SAV in the Potomac River in 1995 (1,906.33 hectares) has not been lower since 1985 when a total of 1,863 hectares were mapped (Tables 6 and 7; VIMS SAV GIS Database). Overall in 1995 in the Potomac River, SAV declined 22% from that in 1994 (2,432.01 hectares) and 47% from that in 1991 (3,595.84 hectares) (Tables 6 and 7; VIMS SAV GIS Database; Orth *et al.*, 1995). Since 1991, the total amount of SAV in the whole river decreased each year despite increases in SAV in one of the three segments, LE2, each year since 1993 (Tables 6 and 7; VIMS SAV GIS Database; Orth *et al.*, 1995). Changes also remained complex within the segments: for example, SAV declined in both RET2 and TF2 in 1995, but there were some areas within these segments where SAV remained very dense and even showed increases in abundance (Figure 24; Tables 6, 7, and 8). The density and species composition of SAV beds, as well as their locations, further complicated the picture of SAV changes in the Potomac River (Figures 23 and 24; Tables 8 and 9; Appendices B and D; Orth *et al.*, 1995).

Lower Potomac River (LE2)

SAV abundance in 1995 in LE2, after increasing in 1993 and 1994, reached the highest level (185.21 hectares) ever recorded since the aerial survey began in 1978, 60% of the Tier I goal of 311.16 hectares (Figure 23; Tables 6 and 7; VIMS SAV GIS Database; Orth *et al.*, 1995). SAV increased 33% from that in 1994 (139.52 hectares); it increased 122% since 1991, when there was a 83.31 hectare peak after two years of increases, which followed three years of declines beginning in 1985; it increased 302% from the 1992 low of 46.10 hectares; it increased 531% since the lowest recorded level of 29.37 hectares in 1987 (Figure 23; Tables 6 and 7; VIMS SAV GIS Database; Orth *et al.*, 1995). Density of SAV increased in 1995 with gains in the moderate category: 68% was dense, 28% moderate, 4% sparse, and 0% very sparse, whereas in 1994, 68% was dense, 9% moderate, 18% sparse, and 5% very sparse (Figure 23; Table 8). However, despite the increases in abundance and density, SAV is absent in most areas of LE2 (Figure 23; Tables 6, 7, and 8).

On the southern shore of the Potomac River in LE2 in 1995, SAV was mapped only in the same few locations as in 1994 (Upper Machodoc, Rosier, and Goldman creeks), and groundtruthing by the Citizens' survey reported only *Z. palustris* and an unidentified species in Popes Creek (Figure 23; Appendices B and D: Maps 66, 76; Orth *et al.*, 1995). The Citizens' survey in 1994 reported *M. spicatum, P. perfoliatus,* and *Z. palustris* in Popes Creek, and *Z. palustris* in the Lower Machodoc Creek (Orth *et al.*, 1995).

On the northern shore of LE2 in 1995, SAV was mapped in a tributary of the St. Marys River, St. Inigoes Creek, in the same location as in 1993 and near where the Citizens' survey reported

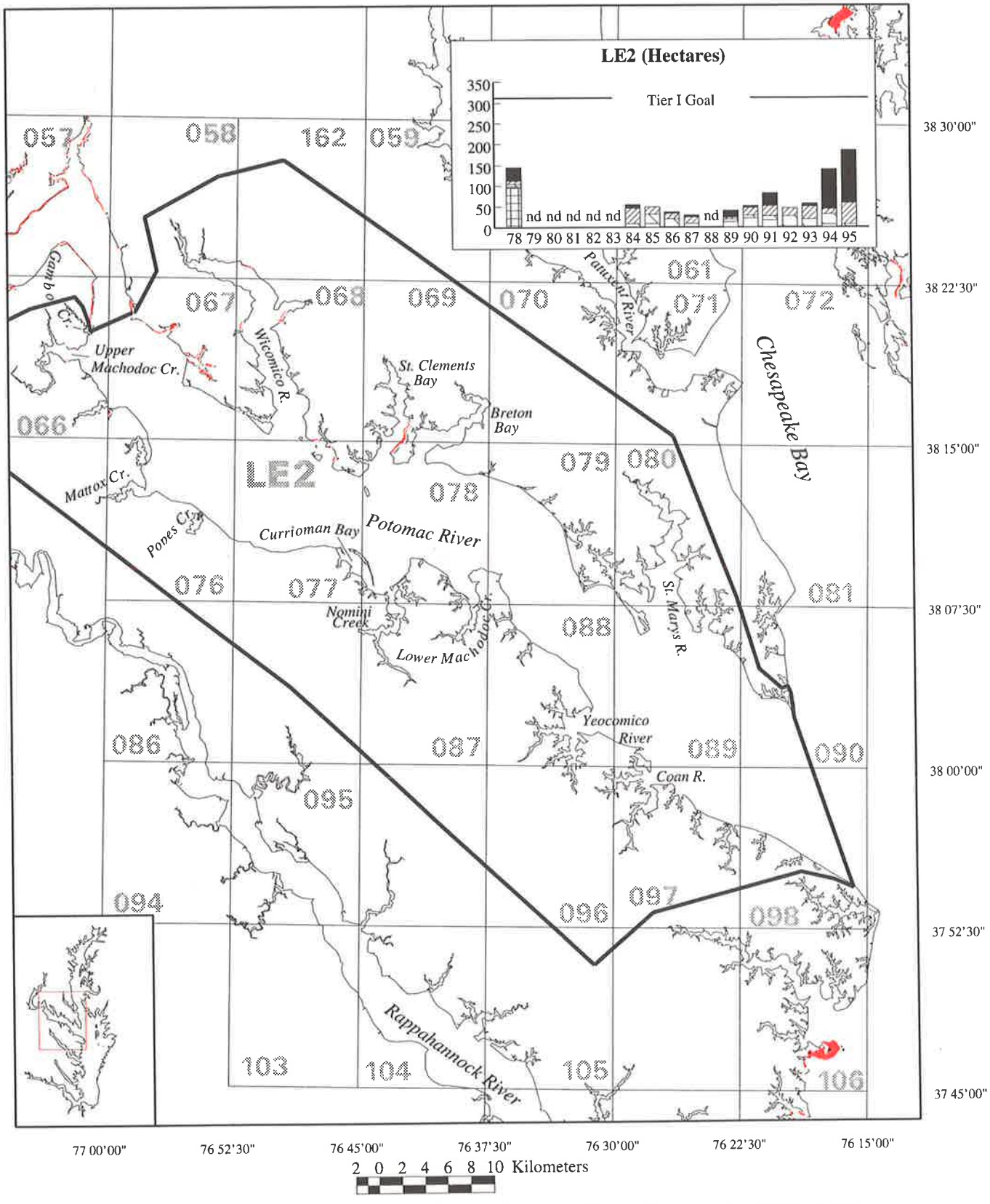

Figure 23: Distribution of SAV in the Lower Potomac River (Segment LE2) in 1995.

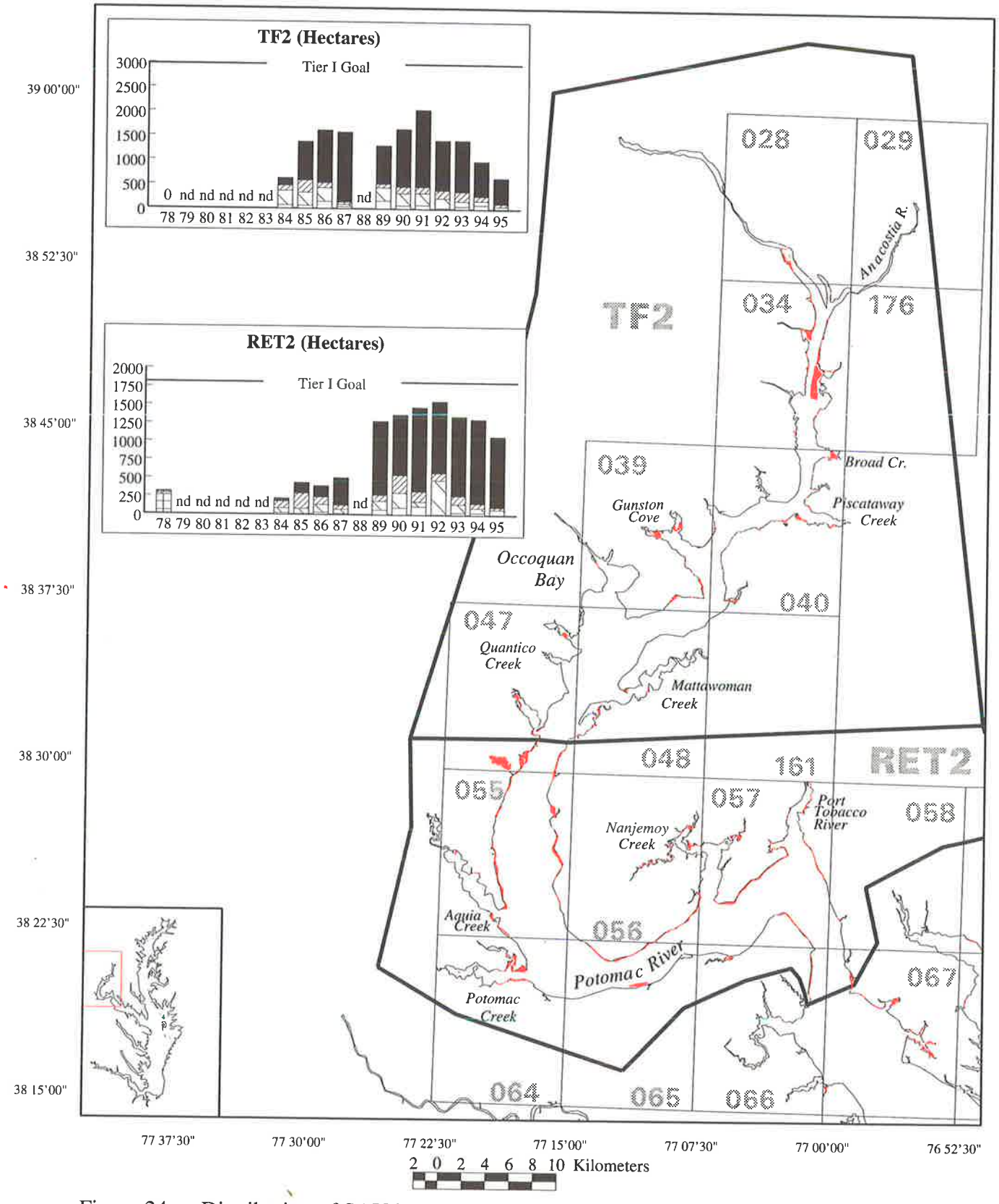

Figure 24: Distribution of SAV in the Middle and Upper Potomac River (Segments TF2, RET2) in 1995.

R. maritima, the only groundtruthing from the St. Marys' watershed in 1995 (Figure 23; Appendices B and D: Map 80; Orth *et al.,* 1994). No SAV was mapped in the St. Marys River in 1994 (Orth *et al.,* 1995).

Elsewhere on the northern shore of the Potomac River, a new large bed was mapped in 1995 near the mouth of St. Clements Bay along Newtown Neck where the USGS survey also reported *R. maritima* (Figure 23; Appendices B and D: Maps 69, 78). There was no groundtruthing from St. Clements Bay in 1994 (Orth *et al.,* 1995).

SAV decreased in the Wicomico River: no beds were mapped downstream of Mills Point, where beds were present in 1994; however, the three beds present in 1994 above Mills Point persisted in 1995 (Figure 23; Appendix B: Maps 68, 162; Orth *et al.,* 1995). The USGS surveyed two of the beds in 1995 and found *M. spicatum* and *R. maritima* at the bed near the mouth of Budds Creek, while only *R. maritima* was found at the bed in Chaptico Bay (Appendices B and D; Maps 68, 162). No groundtruthing was reported in 1994 from the Wicomico River (Orth *et al.,* 1995).

SAV was present in St. Catherine Sound at the mouth of the Wicomico River, where it was present in 1994, and there was also one new bed mapped (Figure 23; Appendix B: Maps 68, 77; Orth *et al.,* 1995). *Ruppia maritima* was reported by the USGS survey in 1995 from these sites and, additionally, from St. Catherine Island (Appendices B and D: Maps 68, 77). No groundtruthing was reported from St. Catherine Sound in 1994 (Orth *et al.*, 1995). The USGS survey also reported *M. spicatum,* and the Citizens' survey reported *Z. palustris,* near the mouth of the Wicomico River in 1995, near Cobb Island (Appendices B and D: Map 68). No groundtruthing was reported from Cobb Island in 1994, however, SAV beds were mapped near there in 1994 which were not mapped in 1995 (Figure 23; Appendices B and D: Map 68; Orth *et al.,* 1995).

SAV remained abundant in Cuckhold Creek and in the Morgantown area, from above Lower Cedar Point to Loyd Point, and showed modest increases, including one new bed in Picowaxen Creek (Figure 23; Appendix B: Map 67). The 1995 USGS survey reported: *M. spicatum, P. perfoliatus, R. maritima,* and *E. canadensis* in Cuckold Creek; *P. perfoliatus* and *R. maritima* from the Lower Cedar Point area; and *P. perfoliatus, P. pectinatus,* and *R. maritima* from Picowaxen Creek (Appendices B and D: Map 67). In 1994, groundtruthing was reported by the Patuxent River Park staff, only from Cuckold Creek: *M. spicatum, P. perfoliatus, E. canadensis, Z. palustris,* and an unidentified species which was erroneously reported as *Z. marina* in the 1994 SAV report (Orth *et al.,* 1995).

Middle Potomac River (RET2)

In RET2 in 1995, after decreasing levels in 1993 and 1994, SAV declined to its lowest recorded level (1,077.51 hectares) since 1987, which followed five years of increases (Figure 24; Tables 6 and 7; VIMS SAV GIS Database). There was an 18% decrease in SAV abundance from the 1994 level of 1,310.23 hectares, and a 30% decrease from the high of 1,551.67 hectares in 1992, however, the

SAV

1995 level was 59% of the Tier I goal of 1,815.23 hectares (Figure 24; Tables 6 and 7; VIMS SAV GIS Database). In 1995 in RET2, 90% of the SAV was classified dense, 3% was moderate, 7% sparse, and only 1% very sparse, similar to 1994 when 88% was dense, 5% was moderate, 5% sparse, and 2% very sparse (Figure 24; Table 8). SAV decreased in the upper portion, but remained abundant in the lower portion, of RET2 in 1995 (Figure 24). *Hydrilla verticillata* was reported, usually with other species, from the TF2 line, to Potomac Creek on the south shore, and to the Port Tobacco River on the north shore (Appendices B and D: Maps 47, 55, 57, 64, 66).

In the lower portion of the RET2, beds mapped in 1994 near the Harry Nice Memorial Bridge persisted on both shores in 1995 (Figure 24; Appendix B: Maps 66, 67; Orth *et al.,* 1995). Groundtruthing by the USGS survey reported *P. perfoliatus, M. spicatum, V. americana, R. maritima,* and *E. canadensis,* only from the east bank south of the bridge, whereas in 1994, the Citizens' survey only reported *P. perfoliatus* and *V. americana* from the west bank north of the bridge (Appendices B and D: Maps 66, 67; Orth *et al.,* 1995).

Elsewhere in the lower portion of RET2, SAV persisted much the same as in 1994: along Popes Creek, in the Port Tobacco River, in Nanjemoy Creek, along Cedar Point Neck, along Riverside and Wellington Beach, and on both sides of Maryland Point, all on the north shore; and along Mathias Point Neck and Somerset Beach, on the south shore (Figure 24; Appendix B: Maps 56, 57, 58, 65; Orth *et al.,* 1995). Also on the south shore, SAV beds were mapped in the mouth of Choptank Creek for the first time since 1992, but there was no groundtruthing to indicate the species present (Figure 24; Appendix B: Map 66; Orth *et al.,* 1993). The USGS survey reported: *R. maritima* from Popes Creek in 1995, but nothing was reported there in 1994; *V. americana, P. perfoliatus,* and *P. pectinatus* from Mathias Point Neck, the Port Tobacco River, Cedar Point Neck, Nanjemoy Creek and the bed along Riverside in 1995, the same species reported by VIMS in 1994, however, *H. verticillata* was also reported in the Port Tobacco River in 1994; *H. verticillata, M. spicatum, V. americana, N. minor,* and *C. demersum* near Maryland Point, and *H. verticillata, M. spicatum, V. americana,* and *N. minor* from Somerset Beach, where no groundtruthing was reported in 1994 (Appendices B and D: Maps 56, 57, 58, 65; Orth *et al.,* 1995).

On the west shore of RET2, SAV increased in Potomac Creek in 1995, and extensive groundtruthing by the USGS reported *H. verticillata, M. spicatum, V. americana, C. demersum, N. guadalupensis, H. dubia,* and *N. minor,* the same species they reported in 1994 (Figure 24; Tables 6 and 7; Appendices B and D: Map 64; Orth *et al.*, 1995). Elsewhere on the west shore of RET2, SAV in Aquia Creek increased in 1995, but SAV in the mainstem Potomac River north of Aquia Creek to Chopawamsic Creek decreased greatly from that in 1994; there were lesser decreases north of Chopawamsic Creek to Quantico and also on the east shore, but they were not as noticeable (Figure 24; Appendix B: Maps 47, 55; Orth *et al.,* 1995). The USGS reported *H. verticillata, M. spicatum, V. americana, C. demersum, H. dubia,* and *N. minor* from Aquia Creek in 1995, and *H. verticillata, M. spicatum, V. americana, C. demersum,* and *N. minor* north of there in the mainstem Potomac River (Appendices B and D: Map 55). The same species were reported from Aquia Creek in 1994

except for *H. dubia;* north of Aquia Creek *P. perfoliatus* and *P. pectinatus* were reported in 1994, but *C. demersum* and *N. minor* were not reported (Orth *et al.,* 1995). The USGS reported *H. verticillata, C. demersum,* and *N. minor* from Chopawamsic Creek in 1995, where no groundtruthing was reported in 1994 (Appendices B and D: Map 47; Orth *et al.,* 1995). North of Chopawamsic Creek to Quantico, and around Chopawamsic Island, the USGS reported *H. verticillata, C. demersum, M. spicatum,* and *N. minor* in 1995, but only reported *H. verticillata, M. spicatum,* and *H. dubia* in 1994 (Appendices B and D: Map 47; Orth *et al.,* 1995).

On the east shore of RET2 in Maps 47 and 55, the USGS reported *H. verticillata, C. demersum, M. spicatum,* and *V. americana* in 1995, the same species reported in 1994 with *H. dubia* (Appendices B and D; Orth *et al.,* 1995).

Upper Potomac River (TF2)

SAV decreased 34% in TF2, from 982.26 hectares in 1994, to 643.61 hectares in 1995 (Figure 24; Tables 6 and 7). This is the lowest level since 1984 (619.51 hectares) and follows declining years and a 68% decrease since 1991, when it had reached its highest level (2,044.19 hectares) since the aerial survey began (Figure 24; Orth *et al.,* 1995; VIMS SAV GIS Database). The 1995 level is 22% of the Tier I goal of 2,984.04 hectares (Figure 24; VIMS SAV GIS Database). Despite the decrease in total hectares in TF2 in 1995, the percentage of SAV classified dense increased from 73% in 1994, to 82% in 1995, the highest since 1991 (78%), and the percentages classified sparse and very sparse decreased: 8% classified moderate, 8% sparse, and 2% very sparse in 1995 compared to 10% moderate, 9% sparse, and 9% very sparse in 1994 (Figure 24; Table 8; Orth *et al.,* 1995).

SAV in TF2 was located on both the eastern and western shores of the Potomac River, from the D.C. area in the northern part of TF2, including from the Georgetown area above the Theodore Roosevelt Bridge (Map 28), and from the East Capitol Street Bridge on the Anacostia River (Map 29), to the southern boundary of TF2, at Quantico on the western shore (Map 47) and at Chicamuxen Creek on the eastern shore (Map 48) (Figure 24; Appendix B). The lower portion from the Woodrow Wilson Bridge (Map 34) to Quantico (Map 47) continued to show reduced abundances of SAV, while above the bridge, SAV continued to thrive and even expand, e.g. Roosevelt Island (Map 28) (Figure 24; Appendix B; Orth *et al.,*1995).

In 1995, SAV in the most northern portion of TF2 was mapped in essentially the same locations as in 1994 on Maps 28, 29, 34, and 176, including the Potomac River from Georgetown to Columbia Island, the Anacostia River, and the Washington Channel, although beds increased in size (approximately 16.00 hectares), especially around Theodore Roosevelt Island (Figure 24; Appendix B; Orth *et al.,*1995). *Hydrilla verticillata* was again the most frequently reported species in these locations: the USGS reported *H. verticillata* in the Anacostia River both in 1994 and 1995, but in 1995, *C. demersum, V. americana, H. dubia,* and *M. spicatum* were reported as well; the USGS reported *H. verticillata* in the Washington Channel with *C. demersum, V. americana,* and

M. spicatum, both in 1994 and 1995, but in 1994, *H. dubia* and *N. guadalupensis* were reported as well; the USGS reported *H. verticillata* with *H. dubia* in this portion of the Potomac River in 1995, and with *M. spicatum* in 1994; and, finally, the Citizens' survey reported *H. verticillata* in this portion of the river with *C. demersum, V. americana,* an unidentified naiad, and an unidentified species in 1995 (Appendices B and D: Maps 28, 29, 34, 176; Orth *et al.,* 1995).

SAV experienced some decreases in 1995 in the Potomac River on Maps 34, 39, and 40, including that portion of TF2 from the Pentagon downstream to the mouth of the Pomonkey Creek on the east shore, and to Mason Neck, including Belmont Bay, on the west shore (Figure 24; Table 7; Appendix B). On Map 34 in 1995, SAV was mapped in essentially the same locations as in 1994, except that two new beds were mapped in and near the mouth of Broad Creek, and two new beds were mapped just north of I-95; the only large change was a decrease in the southern portion of the large bed by the Woodward Wilson Bridge (Map 34), while the northern portion of the bed remained dense and little changed from earlier surveys (Figure 24; Appendix B; Orth *et al.,* 1995). On Map 39 in 1995, SAV was also mapped in essentially the same locations as in 1994, except that beds disappeared or decreased in Belmont Bay (23.60 hectares), and decreased in Gunston Cove (7.23 hectares), Accotink Bay (1.99 hectares), and at Gunston Manor (1.95 hectares), accounting for the loss of hectares to this quadrangle (Figure 24; Table 7; Appendices B and C; Orth *et al.,*1995). However, SAV increased elsewhere on Map 39, on Mason Neck (5.90 hectares) for example, and a new bed in Gunston Cove (0.16 hectares), to partially offset the losses elsewhere on this quadrangle (Figure 24; Table 7; Appendices B and C; Orth *et al.,* 1995). On Map 40 in 1995, SAV was also mapped in essentially the same locations as in 1994, except that increases occurred in beds along Collingwood on the west shore (1.22 hectares) and the shore opposite (1.19 hectares), and along Marshall Hall and the River Road to Fenwick (2.42 hectares), which partially offset losses in hectares elsewhere in this quadrangle, such as in Piscataway and Broad creeks (Figure 24; Table 7; Appendices B and C; Orth *et al.,* 1995). In 1995, as in 1994, *H. verticillata* was reported frequently and extensively by the USGS throughout most of this portion of TF2, usually with one or more other species, including *C. demersum, V. americana, H. dubia, M. spicatum, N. minor, N. guadalupensis, P. pectinatus,* and *P. crispus,* although *H. dubia* was not reported below Rosier Bluff (Map 34) in 1995, and the later three species were each reported only once or twice (the latter two were not reported at all in 1994) (Appendices B and D: Maps 34, 39, 40; Orth *et al.,* 1995).

In 1995, as in 1994, SAV was absent from the Port Tobacco quadrangle (Map 161), the northwest corner of which has a small portion of the Potomac River in TF2 (Figure 24; Table 7; Orth *et al.,* 1995). There was also no groundtruthing reported for Map 161 in 1995, as in 1994 (Appendix D; Orth *et al.,* 1995).

The biggest loss of SAV in TF2 (308.20 hectares) was from both shores of the Potomac River in the Quantico and Indian Head quadrangles (Maps 47 and 48): especially from Neabsco, Powell, and Quantico creeks, and the shoreline south of Cockpit Point, all on the west shore; and from Mattawoman Creek, and, especially, the shoreline from Indian Head to Deep Point and Chicamuxen Creek, on the east shore (Figure 24; Table 7; Appendix B; Orth *et al.,*1995). There were no new

beds mapped in TF2 on these two quadrangles in 1995; the majority of beds mapped in 1994 either decreased in size or disappeared entirely, and there were increases in only two, bed F4 (3.67 hectares) in the mouth of Quantico Creek on Map 47, and bed G3 (1.01 hectares) in the narrow upstream portion of Chicamuxen Creek on Map 48 (Appendices B and C; Orth *et al.,* 1995). In 1995 in Maps 47 and 48, as in 1994, *H. verticillata* was reported by the USGS from both shorelines, usually with one or more other species, including *C. demersum, V. americana, M. spicatum, N. minor,* and *H. dubia,* although *H. dubia* was reported only once (Appendix B: Maps 47, 48; Orth *et al.,* 1995). In 1995, *H. verticillata* was commonly reported with only *N. minor* in this portion of TF2 from some sites in both Mattawoman and Chicamuxen creeks, as well as from one site below Cockpit Point on the western shore of the Potomac River (Appendices B and D: Map 48). In 1995, *H. dubia* was reported only once on this portion of TF2, on Map 48 at Potomac Heights on the eastern shore of the Potomac River, after being reported upstream last at Rosier Bluff (Map 34), also on the eastern shore of the Potomac River (Appendices B and D). In 1994, *H. dubia* was reported from Maps 39 and 40, as well as being reported from on Maps 47 and 48 in the large bed in the mouth of Chicamuxen Creek (Orth *et al.,* 1995).

LOWER CENTRAL CHESAPEAKE BAY (CB5)

In CB5, SAV decreased 13% (459.08 hectares), from 3,533.27 hectares mapped in 1994, to 3,074.19 hectares in 1995, 48% of the Tier I goal of 6,350.68 hectares (Figure 25; Tables 6 and 7; VIMS SAV GIS Database). Despite this decline, the 1995 level was 25% of the SAV in the Middle Bay zone, the second highest percentage in this zone (Tables 6 and 7). SAV totals increased only slightly in two quadrangles in CB5 in 1995 (Maps 100, 107) and declined in seven of nine quadrangles (Maps 82, 83, 91, 99, 106, 112, 179) (Figure 25; Table 7; Appendix B). SAV was absent in Map 82 in 1995, compared to 1994 when there were 10.43 hectares mapped at Cow Cove on Hooper Island (Table 7; Appendix B; Orth *et al.,* 1995). SAV density increased in 1995: 35% was classified dense compared to 21% in 1994; and 5% was moderate, 51% was sparse, and 9% was very sparse in 1995, while 24% was moderate, 47% sparse, and 8% was very sparse in 1994 (Figure 25: Table 8).

On the eastern side of CB5 in 1995, reduction or absence of beds mapped in 1994 occurred at: Pone and Northeast coves, and Adam and Holland islands, on Map 83; Sheapshead Harbor, and Smith, Troy, and Swan islands, on Map 91; Smith Island, Rhodes Point, and Tyler Creek, on Map 99; and Big Thorofare on Map 100 (Figure 25; Appendix B; Orth *et al.,* 1995). SAV distribution was similar to 1994 at Goose and Tangier islands, on Maps 107 and 179, except more SAV was classified dense in 1995 (Figure 25; Appendix B; Orth *et al.,* 1995). SAV increased at Thorofare Island and at Horse Hammock Point on Smith Island in 1995 (Figure 25; Appendix B: Maps 100, 107). On the eastern side of CB5 in 1995, VIMS reported *Z. marina* and *R. maritima* at southern Smith Island and at the Fishbone Island area; only *R. maritima* was reported at Holland and South Marsh islands, and at the north end of Smith Island (Appendices B and D: Maps 83, 91, 99). No groundtruthing was reported from the eastern side of CB5 in 1994 (Orth *et al.,* 1995).

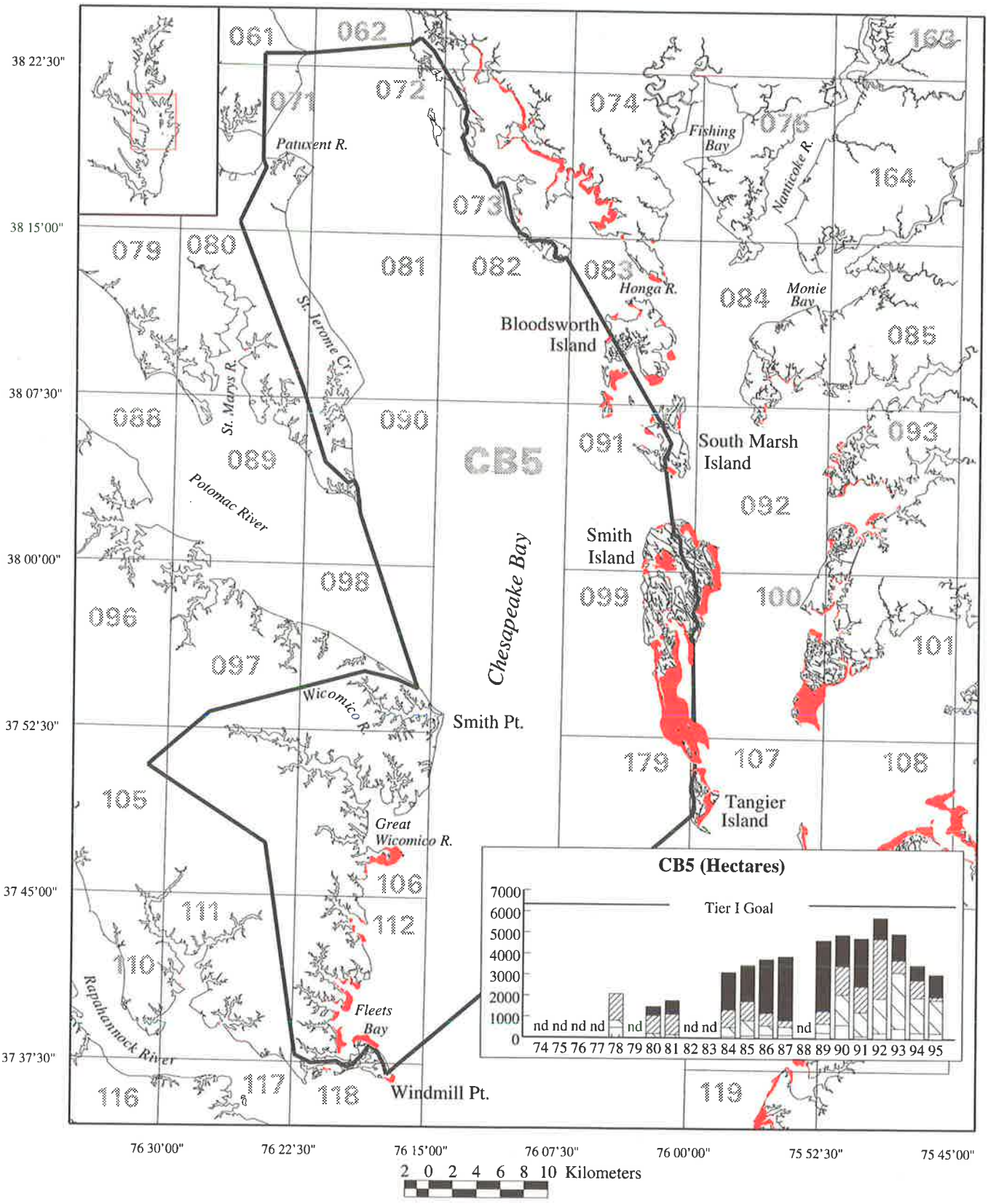

Figure 25: Distribution of SAV in the Lower Chesapeake Bay (Segment CB5) in 1995.

On the western side of CB5 in 1995, less SAV was mapped in Dividing, Dymer, and Prentice creeks, and SAV was absent in Ingram Cove on Map 112, compared to 1994 (Figure 25; Appendix B; Orth *et al.,* 1995). SAV beds, while somewhat reduced, were still abundant at Fleets Bay on Map 112, and at Dameron Marsh and Cloverdale Creek on Map 106, while new beds were mapped at Ball Creek and Fleet Point on Map 106, and at Indian Creek on Map 112 (Figure 25; Appendix B).

In the western side of CB5 in 1995, the Citizens' survey reported *Z. palustris, R. maritima*, and *Z. marina* as in 1994, and an unknown species (Appendices B and D: Maps 71, 106, 112). In the Hog Point areas of Goose, Harper, and Pearson creeks, as well as Pine Hill Run, near the mouth of the Patuxent River, there were many sitings of *Z. palustris,* as well as one siting in Pearson Creek of *R. maritima* and an unidentified species, which was most likely either *Z. palustris* or *Z. marina* (Appendices B and D: Map 71). There were several sitings of *R. maritima,* and one siting of an unidentified species, in the Great Wicomico River (Appendices B and D: Map 106). Both *R. maritima* and *Z. marina* were reported from beds adjacent to Dameron Marsh, from the Dividing Creek area, and from the Fleets Bay area (Appendices B and D: Maps 106, 112).

Lower Bay Zone

RAPPAHANNOCK RIVER (LE3, RET3, TF3)

LE3, the Lower Rappahannock River, the only one of the Rappahannock River segments with SAV from 1971-1995, decreased 51% in 1995 (Figure 26; Tables 6 and 7; VIMS SAV GIS Database).

Upper Rappahannock River (TF3) and Middle Rappahannock River (RET3)

The Upper Rappahannock River segment (TF3) and Middle Rappahannock River segment (RET3) had no SAV reported since the aerial survey began in 1971 (Figure 26; VIM SAV GIS Database).

Lower Rappahannock River (LE3)

SAV in LE3 decreased 51% in 1995, to 96.79 hectares, from 196.51 hectares in 1994 (Figure 26; Tables 6 and 7). LE3 had only 1.12% of the SAV in the Lower Bay zone in 1995 and only 6% of the Tier I goal (1,752.45 hectares) (Figure 26; Table 6; VIMS SAV GIS Database). Density declined in 1995: 69% of the SAV was classified very sparse, an increase over the 42% classified very sparse in 1994; SAV that was classified sparse decreased from 51% in 1994, to 27% in 1995; SAV that was classified moderate decreased from 6% in 1994, to 4% in 1995; no SAV was classified dense, a decrease from the 2% classified dense in 1994 (Figure 26; Table 8).

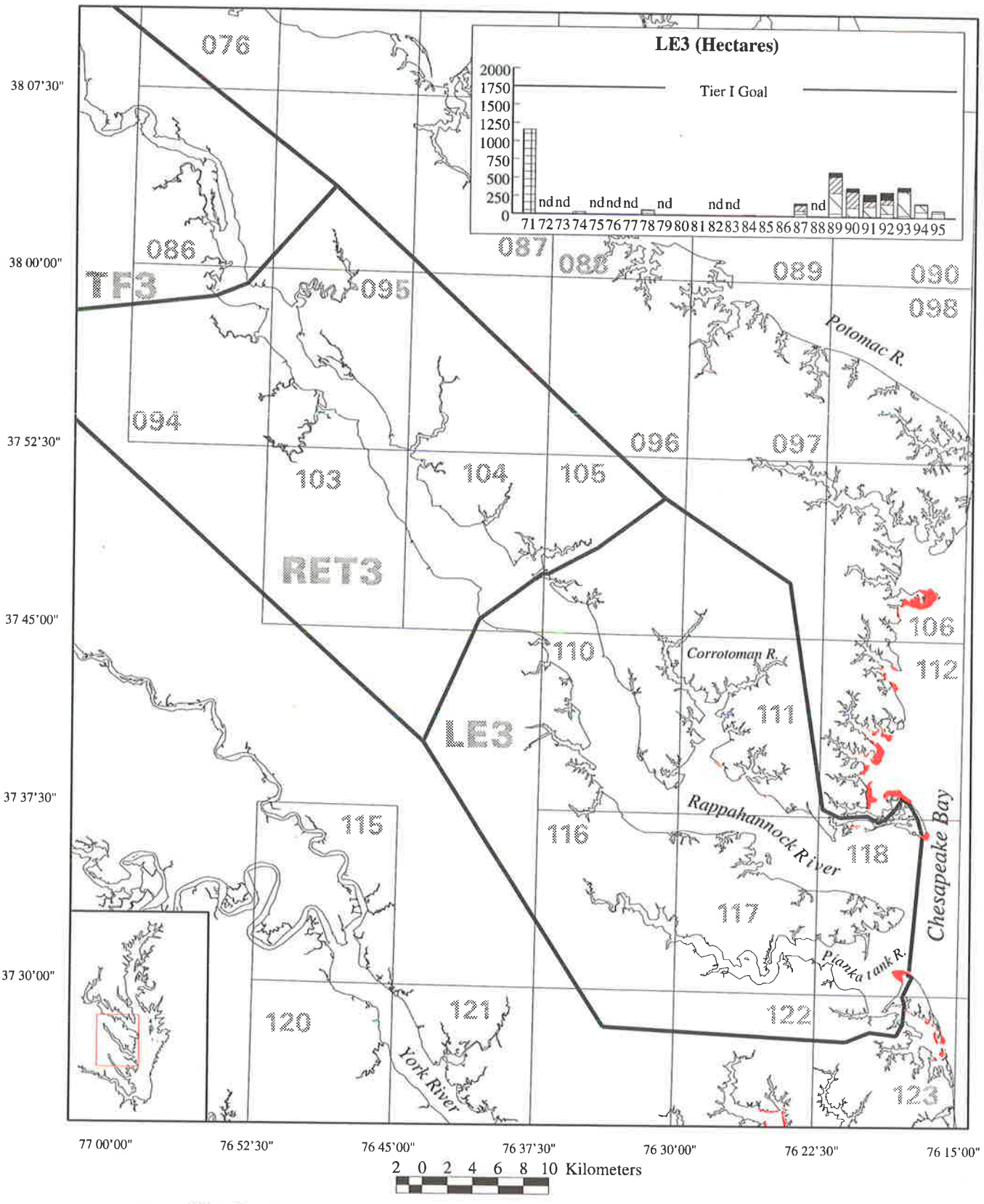

Figure 26: Distribution of SAV in the Rappahannock River (Segments LE3, RET3, TF3) in 1995.

In LE3, some of the beds were reduced in size or absent compared with 1994 in the Rappahannock, Piankatank, and Corrotoman rivers, with most of the decline in the western branch of the latter (Figure 26; Appendix B: Maps 111, 118, 123; Orth *et al.,* 1995). Only one small bed was mapped at the mouth of Piankatank River, at Stove Point Neck, a bed that was planted in 1994 as part of the VIMS seagrass restoration program funded by the Virginia Saltwater Recreational License Fund; the bed at Burton Point in 1994 was absent (Figure 26; Appendix B: Map 118: Orth *et al.,* 1995). SAV beds at Gwynn Island were reduced in size compared to 1994 (Figure 26; Appendix B: Map 118, 123; Orth *et al.,* 1995). On the north shore of the Rappahannock River, SAV beds were still present although reduced, at Carter and Mosquito creeks and at Windmill Point, and new beds were mapped at Corrotoman Point and west of the Norris Bridge; on the south shore, the one bed mapped at Parrot Island in 1994 was absent in 1995 (Figure 26; Appendix B: Maps 111, 117, 118; Orth *et al.,* 1995).

In 1995, *R. maritima* and *Z. marina* were reported from LE3, as in 1994 (Appendices B and D: Maps 111, 118, 123). Only *R. maritima* was reported from the north shore of the Rappahannock River, by VIMS and Citizens' surveys, at the mouths of the Corrotoman River and Carter Creek, and from just west of the Norris Bridge (Appendices B and D: Map 111). *Zostera marina* and *R. maritima* were reported by VIMS from the mouth of the Piankatank River: only *Z. marina* was reported from the eastern side of Stove Point Neck and from the southern shore of Gwynn Island in Milford Haven; both *Z. marina* and *R. maritima* were reported at the north end of Gwynn Island (Appendices B and D: Maps 111, 118).

WESTERN LOWER CHESAPEAKE BAY (CB6)

SAV in CB6 decreased for the second consecutive year, to 509.10 hectares in 1995, a 14% decrease from 1994, the lowest level since 509.22 hectares in 1990, and 65% of the Tier I goal of 785.80 hectares (Figure 27; Tables 6 and 7; VIMS SAV GIS Database). SAV decreased from the 1993 survey high of 756.69 hectares, to 592.33 hectares in 1994 (Figure 27; VIMS SAV GIS Database).

Despite decreases in SAV in CB6, the percentage of SAV classified dense increased for the first time since 1989: 41% in 1995, compared to 10% in 1994 (Figure 27; Table 8; VIMS SAV GIS Database). Conversely, the percentage of moderate SAV decreased from 44% in 1994, to 12% in 1995 (Figure 27; Table 8). Very sparse and sparse SAV remained at essentially the same levels, 17% and 29%, respectively, in 1995, as in 1994, 18% and 28%, respectively (Figure 27; Table 8).

SAV was present from New Point Comfort to Winter Harbor, and at Windmill Point and Gwynn Island, as in 1994 (Figure 27; Appendix B, Maps 118, 123, 132, 177, 178). Most of the decline occurred in Map 123, which had 64.10 hectares less in 1995 than in 1994 (and 146.32 hectares less in 1994 than in 1993) with the apparent decreases at Milford Haven, The Hole in the Wall, Whites Creek, and Winter Harbor (Figure 27; Table 7; Appendix B: Map 123; Orth *et al.,* 1995).

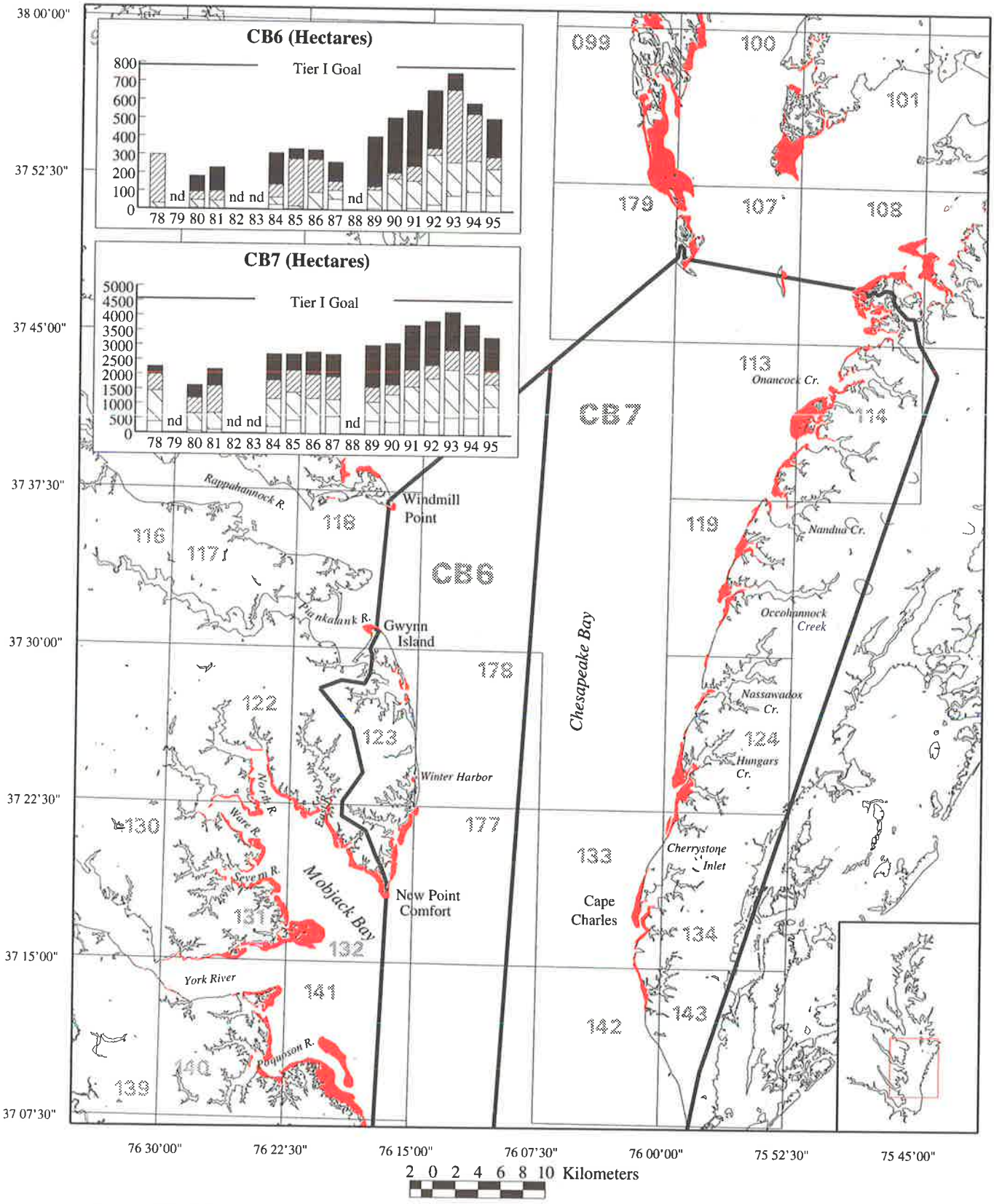

Figure 27: Distribution of SAV in the Lower Chesapeake Bay (Segments CB6, CB7) in 1995.

VIMS reported *R. maritima* and *Z. marina* in 1995, from a few sites on the western boundary of CB6, as in 1994: *Z. marina* at Windmill Point; and *R. maritima* and *Z. marina* from Gwynn Island and from The Hole In The Wall (Appendices B and D: Maps 118, 123).

EASTERN LOWER CHESAPEAKE BAY (CB7)

CB7 continued to have the second largest amount of SAV in the Lower Bay zone (38% in 1995), as it has since the aerial survey began (Figure 27; Table 6; VIMS SAV GIS Database).

There was a decrease in SAV in 1995: from the high point of 4,183.80 hectares in 1993; to 3,748.74 hectares in 1994; to 3,321.33 hectares in 1995 (Figure 27; Tables 6 and 7; Orth *et al.*, 1995). The 1995 level was 73% of the Tier I goal of 4,559.60 hectares (Figure 27; VIMS SAV GIS Database). The percentage of SAV classified dense increased in 1995, to 35%, after decreasing each year from 1990 to 1994 (45% to 23%) (Figure 27; Table 8; Orth *et al.*, 1995). The SAV classified very sparse also increased, from 16% in 1994, to 29% in 1995 (Figure 27; Table 8). Sparse and moderate SAV decreased: 23% was sparse in 1995, and 40% in 1994; 13% was moderate in 1995, and 21% in 1994 (Figure 27; Table 8).

Large beds persisted at the mouth of Cherrystone Inlet and Kings Creek near Cape Charles, at the mouth of the Gulf, and at the mouths of Old Plantation, Elliotts, Mattawoman, Hungars, Nassawadox, Occohannock, Craddock, Nandua, Butcher, Pungoteague, Matchotank, Onancock, Back, Chesconessex, and Pompco creeks (Figure 27; Appendix B: Maps 108, 113, 114, 119, 124, 133, 134, 142). Large beds also occurred at the Big Marsh area (Figure 27; Appendix B: Map 108). SAV beds were mapped at Cod Harbor on Tangier Island, and at Watts Island (Figure 27; Appendix B: Map 107). There was no SAV mapped from Pond Drain, below Elliotts Creek (Map 142), to Fisherman Island in the mouth of the Chesapeake Bay (Figure 27; Appendix B).

VIMS reported both *R. maritima* and *Z. marina* in 1995 from The Gulf and Cape Charles, and from the mouths of Pompco, Matchotank, Pungoteague, Nassawadox, and Hungars creeks (Appendices B and D: Maps 108, 114, 124, 133, 134). The Citizens' survey reported an unknown species at Watts Island (Map 107) and also in Onancock Creek along with *Z. marina* in 1995 (Appendices B and D: Map 114). VIMS reported only *R. maritima* at the mouth of Occohannock Creek (Map 119) in 1995, while Citizens reported only *R. maritima* at Nassawadox Point, as in 1994 (Appendices B and D: Map 124). VIMS reported only *Z. marina* from the mouths of Nandua and Craddock creeks, and Cherrystone Inlet (Map 113) (In 1994, *R. maritima* was also reported at Cherrystone Inlet.) and near Parkers Marsh and Finney Island (Map 114), while Citizens reported *Z. marina* at the mouth of Matchotank Creek (Appendices B and D: Map 114; Orth *et al.*, 1995).

MOBJACK BAY (WE4)

WE4 had the largest amount of SAV in the Lower Bay zone in 1995 (53%), as it has throughout the history of the aerial survey (Figure 28; Tables 6 and 7; VIMS SAV GIS Database). In WE4 there was a slight increase in SAV, from 4,592.67 hectares in 1994, to 4,608.55 hectares in 1995 (Figure 28; Tables 6 and 7). This is still less than the 4,635.34 hectares in 1993, the highest level reported since the aerial survey began (Figure 28; VIMS SAV GIS Database). Almost 79% of the Tier I goal of 5,843.98 hectares was attained in 1995 (Figure 28; VIMS SAV GIS Database). The majority of SAV in WE4 continued to be classified dense, however, the percentage decreased from 71% in 1994, to 69% in 1995 (Figure 28; Table 8). The percentage classified very sparse and that classified sparse, 8% and 12%, respectively, in 1994, were 6% and 16%, respectively, in 1995; and that classified moderate, 9%, in 1994, was 8% in 1995 (Figure 28; Table 8).

WE4 continued in 1995 to have some of the more extensive SAV beds on the western shore of the lower Chesapeake Bay: along the entire shoreline of Mobjack Bay; as well as the lower reaches of the Severn, Ware, North, East, Poquoson, York, and Back rivers (Figure 28; Appendix B: Maps 122, 123, 131, 132, 140, 141, 147). VIMS and Citizens' surveys reported *Z. marina* and *R. maritima* from Maps 131 and 132, as in 1994, but not from Map 140: *R. maritima* alone was sited in the East River; *Z. marina* alone was sited near Allen Island and Sandy Point in the York River; and *Z. marina* and *R. maritima* were sited near Browns Bay and from the Guinea Marshes at the mouth of the York River (Appendices B and D: Maps 131, 132; Orth *et al.,* 1995).

YORK RIVER (LE4, RET4, TF4)

In the York River there was a slight increase of SAV reported for 1995, from LE4, the only segment to have any SAV throughout the history of the aerial survey (Figure 29; VIMS SAV GIS Database).

Lower York River (LE4)

SAV in LE4 continued to increase slightly in 1995 (6%), as it has each year since 1991, from 78.29 hectares in 1994, to 82.79 hectares in 1995, 27% of the Tier I goal of 305.69 hectares (Figure 29; Tables 6, 7; Orth *et al.,* 1995; VIMS SAV GIS Database). LE4 continued to have the majority (67% in 1995) of SAV classified as dense, as it has since 1985, although this is a decline from 77% dense in 1994 and 86% dense in 1993 and 1992 (Figure 29; Table 8; VIMS SAV GIS Database). LE4 had 13% classified moderate in 1995, whereas none was moderate in 1994; 15% was very sparse and 5% sparse in 1995, whereas 12% was very sparse and 11% sparse in 1994 (Figure 29; Table 8).

SAV was documented for a portion of the south shore of the York River downstream from the Coleman Bridge, as in 1994, for the third year in a row, and was absent upstream of the Coleman Bridge along the south shore except for three small beds (Figure 29; Appendix B: Maps 139, 140; Orth *et al.,* 1995). Along the north shore, beds were located from the Coleman Bridge to the mouth, with none upstream of the bridge, as in 1994 (Figure 29; Appendix B: Maps 139, 140; Orth *et al.,*

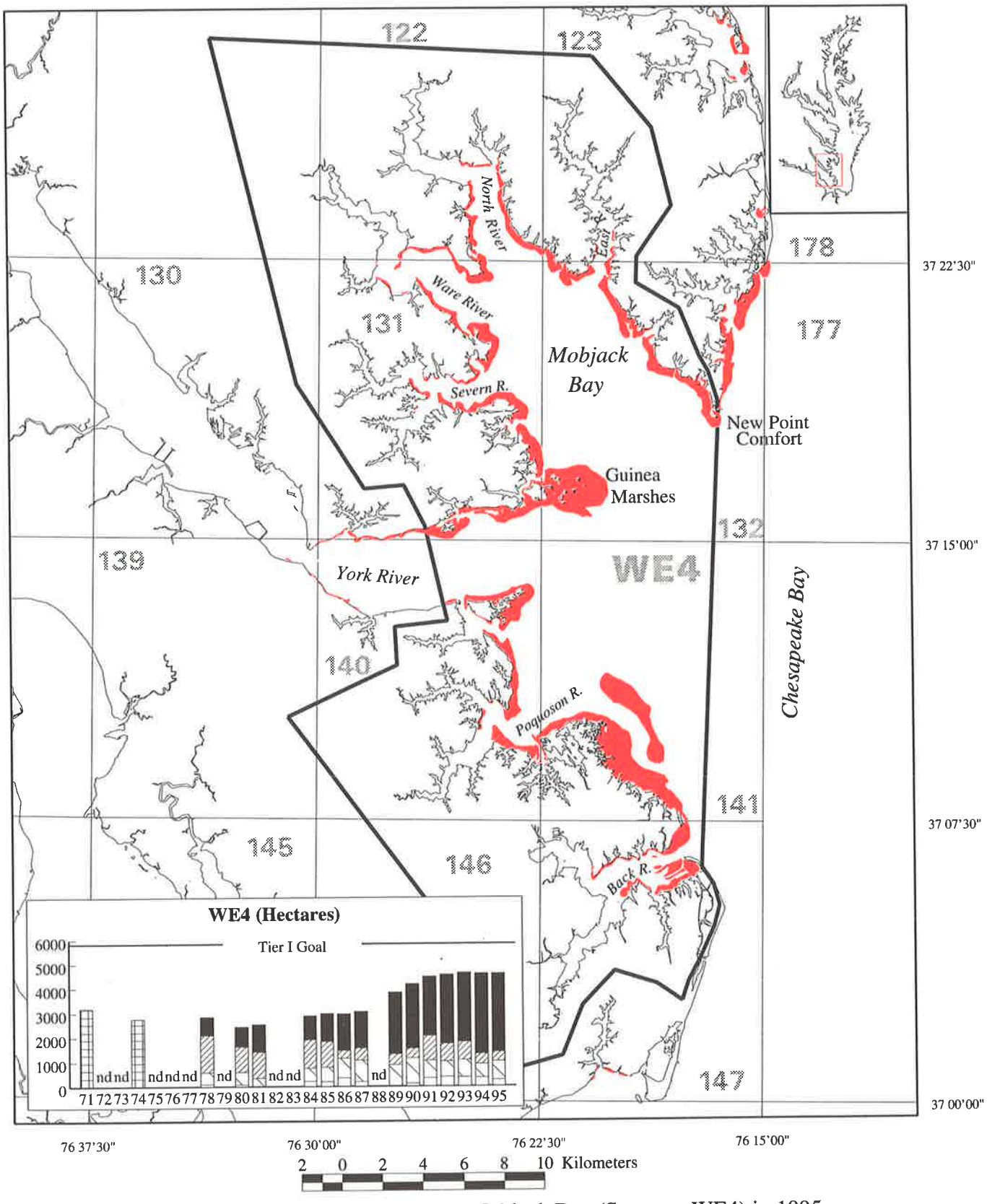

Figure 28: Distribution of SAV in the Mobjack Bay (Segment WE4) in 1995.

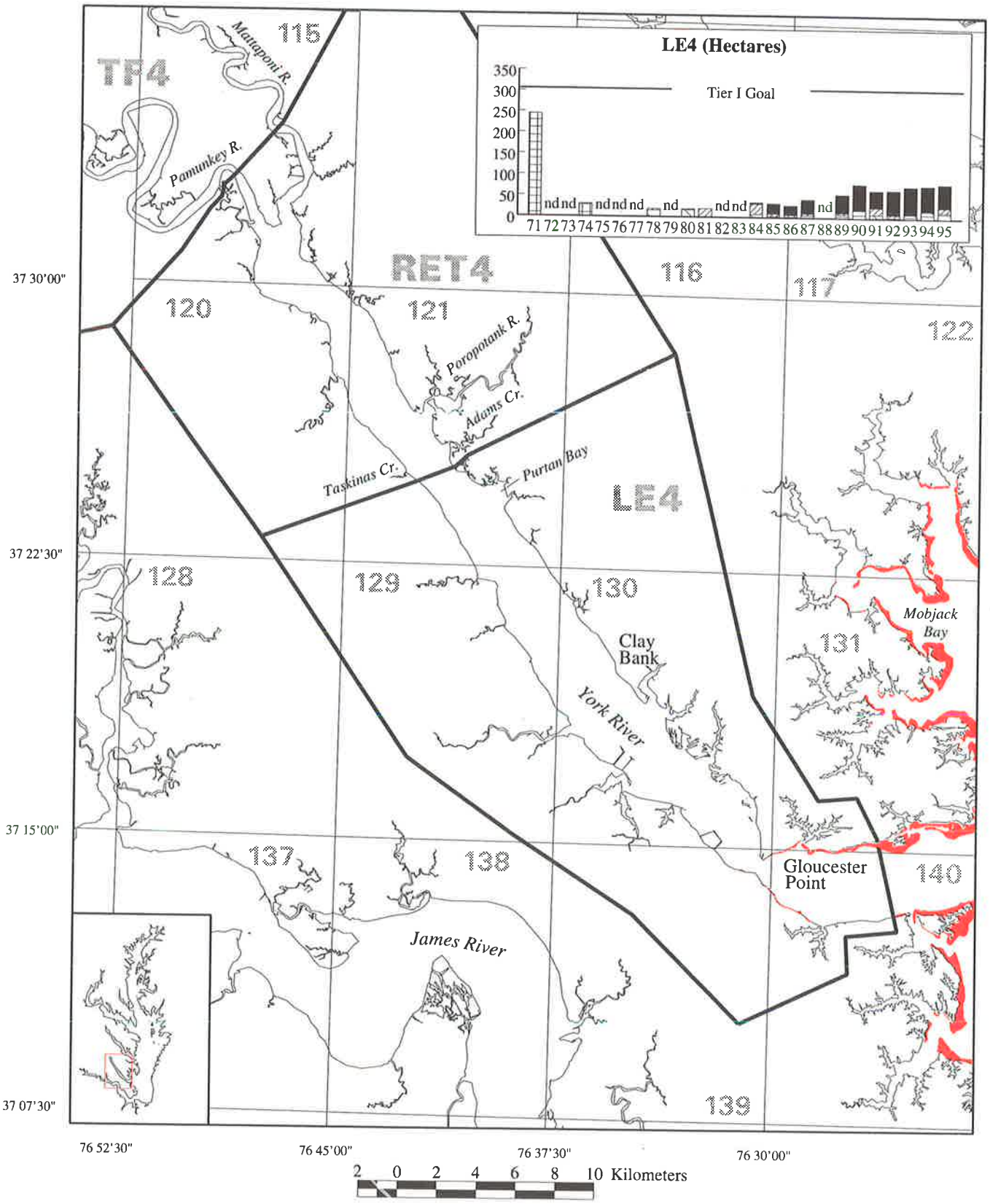

Figure 29: Distribution of SAV in the York River (Segments LE4, RET4, TF4) in 1995.

1995). VIMS noted *Z. marina* on the north shore at Gloucester Point, east of the Coleman Bridge, and along the south shore adjacent to the U.S. Naval Supply Center and to Yorktown, both east and west of the Coleman Bridge (Appendices B and D: Maps 139, 140).

The Upper York River (TF4) and Middle York River (RET4)

TF4 and RET4 had no SAV mapped in 1995, as has been the case since 1971 (Figure 29; Tables 6 and 7; VIMS SAV GIS Database). No ground-truth data were reported for TF4 in 1995, as in 1994 (Orth *et al.,* 1995). VIMS reported six species (*P. pectinatus, Z. palustris, E. canadensis, P. crispus, C. demersum,* and *Nitella* sp.) from one site in the upper Poropotank River, a tributary of the York River, in RET4, in 1995. The last reported VIMS survey of SAV in the Poropotank River in 1978 found all these species except *P. crispus* and *Nitella* sp. (Orth *et al.,* 1979).

JAMES RIVER (LE5, RET5, TF5)

SAV abundance in the James River (LE5, RET5, TF5) in 1995 increased from that in 1994, although SAV was still mapped only at one location in LE5 (Figure 30; Tables 6 and 7). The distribution of SAV in LE5 also changed in 1995 as three new beds appeared (Figure 30; Appendix B: Map 147).

Lower James River (LE5)

SAV increased 152% in LE5 to 15.40 hectares in 1995, compared to 6.10 hectares in 1994 (Figure 30; Tables 6 and 7). The 1995 level is 97% of the Tier I goal of 15.89 hectares (Figure 30; VIMS SAV GIS Database). No SAV was classified dense in 1995, as in 1994, a decline from 100% dense in 1993 (Figure 30; Table 8; Orth *et al.,* 1995). Approximately the same amount was classified moderate as in 1994, 6.11 hectares in the same persistent bed; the remaining 9.29 hectares was classified very sparse, mainly in three new beds (Figure 30; Table 8; Appendices B and C: Map 147).

For the first time since 1987, the distribution of SAV changed in LE5: until 1995 only one bed was mapped in the mainstem of the river, at the mouth of Hampton River adjacent to the Veterans Affairs Medical Center (Figure 30; Appendix B: Map 147; VIMS SAV GIS Database). This bed persisted and increased in 1995, and three new adjacent beds were mapped, all reported by VIMS to be *Z. marina* (Figure 30; Appendices B and D: Map 147). Beds U1 and V1 included small plots of *Z. marina,* transplanted in the fall of 1994 as part of the VIMS seagrass restoration program funded by the Virginia Saltwater Recreational License Fund (Appendices B and D: Map 147).

Upper James River (TF5) and Middle James River (RET5)

TF5 and RET5 had no SAV mapped and no ground-truth data reported in 1995, as in 1994 (Figure 30; Tables 6 and 7; Orth *et al.,* 1995).

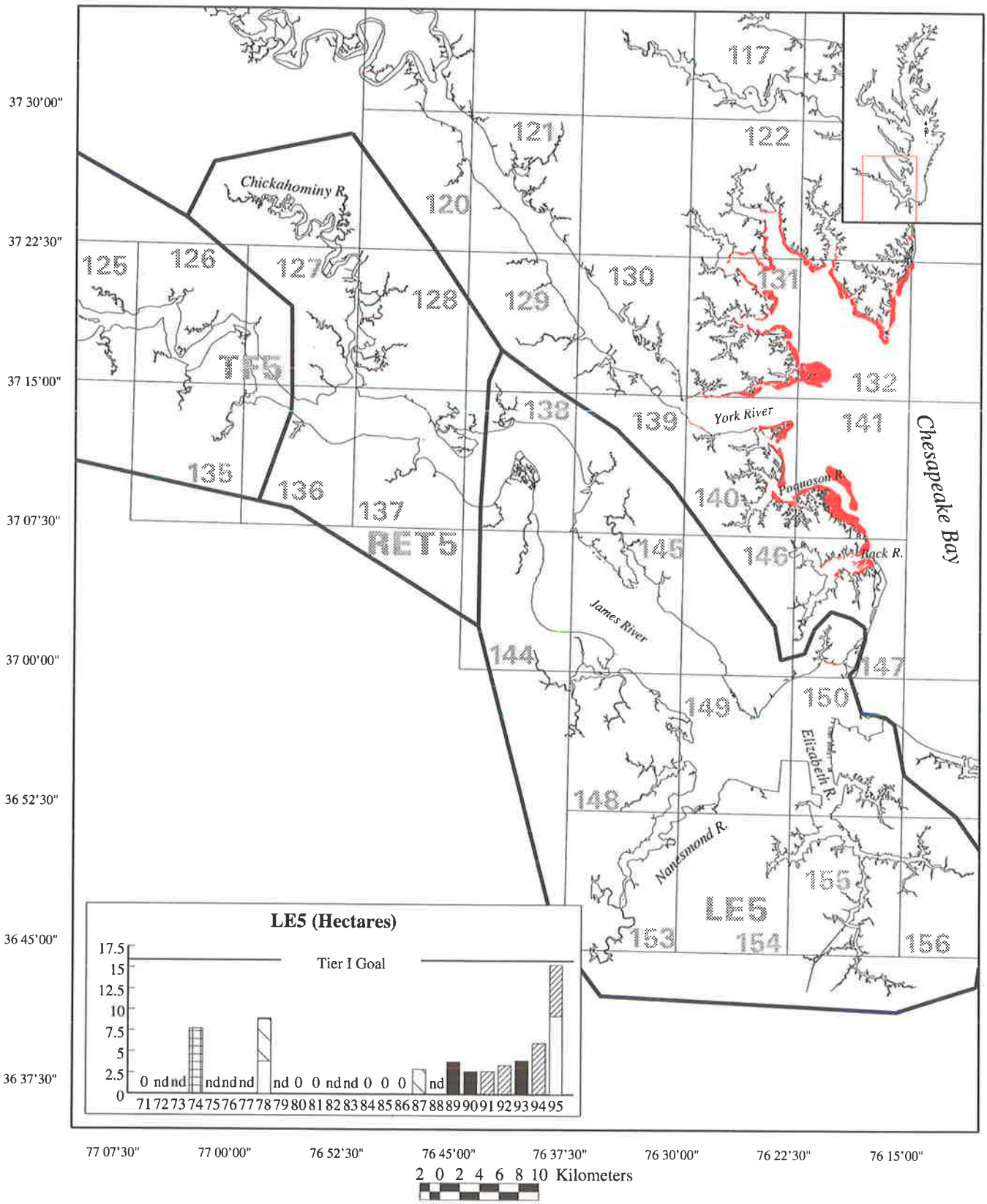

Figure 30: Distribution of SAV in the James River (Segments LE5, RET5, TF5) in 1995.

MOUTH OF THE CHESAPEAKE BAY (CB8)

SAV mapped in CB8 in 1995 totaled 17.00 hectares, a decrease of 60% from the 42.65 hectares in 1994 (the highest level since 43.20 hectares were mapped in 1986), and was below the Tier I goal of 71.18 hectares (Figure 31; Tables 6 and 7; VIMS SAV GIS Database). There were 3.32 hectares (or 20%) of dense SAV in 1995, a change from 1991-1994 when none were dense; there was no SAV classified moderate in 1995 and 1994, a decline from 33% in 1993; there was 28% sparse SAV and 52% very sparse SAV in 1995, a contrast with 1994 when 69% was sparse and 31% was very sparse (Figure 31; Table 8; Orth *et al.,* 1995).

In 1995, SAV remained abundant in Broad Bay as in the past several years, but was not present in Linkhorn Bay as in 1994 or, before that, in 1990 (Figure 31; Appendix B: Map 152; Orth *et al.,*1995). SAV was mapped in Little Creek for the first time in the history of the aerial SAV survey (Figure 31; Appendices B: Map 151; VIMS SAV GIS Database). The size and density of this bed suggested it was developing for the past few years, and re-examination of previous years aerial photography found the SAV signature, which apparently went undetected prior to this primarily because of its isolated location.

VIMS and Citizens' surveys found only one species in CB8 in 1995: *Z. marina* was noted in Broad Bay and Little Creek Channel (Appendices B and D: Maps 151, 152). No *R. maritima* was noted in Broad Bay or in Linkhorn Bay in 1995, although it was found there in 1994 (Appendices B and D: Maps 151, 152; Orth *et al.,*1995).

CHINCOTEAGUE BAY SECTION (The Delmarva Barrier Island Bays)

This section name, Chincoteague Bay, (except where noted) in the text, tables, and figures refers to a composite of four Atlantic coast, barrier island bays of the Delmarva peninsula: Chincoteague, Sinepuxent, Assawoman, and Isle of Wight bays. There were 3,758.29 hectares of SAV mapped in 1995 in these bays, compared to 4,117.53 hectares in 1994, a decline of 359.24 hectares or 9% (Figure 32; Tables 5-7). Density declined in 1995, when a majority of the SAV (64%) was in the dense and moderate classes combined (15% dense; 49% moderate), compared to 86% in 1994; the sparse and very sparse density classes combined contained 36% (24% sparse; 12% very sparse), compared to13% in 1994 (Figure 32; Tables 8 and 9). In 1994, 55% was classified dense, 31% moderate, 12% sparse, and 1% very sparse (Figure 32; Table 8). Since 1991, the largest percentage of SAV in the Chincoteague Bay section was classified dense, 54% or above each year, and that classified very sparse was 5% or under each year (Figure 32; Orth *et al.,* 1995).

The total hectares for the component bays of this section in 1995 are: Chincoteague Bay proper, 3,390.77 hectares; Sinepuxent Bay, 223.16 hectares; Isle of Wight Bay, 20.82 hectares; Assawoman Bay, 113.72 hectares (Figure 32; Appendices B and C: Maps 166, 167, 168, 170, 172-175). Most

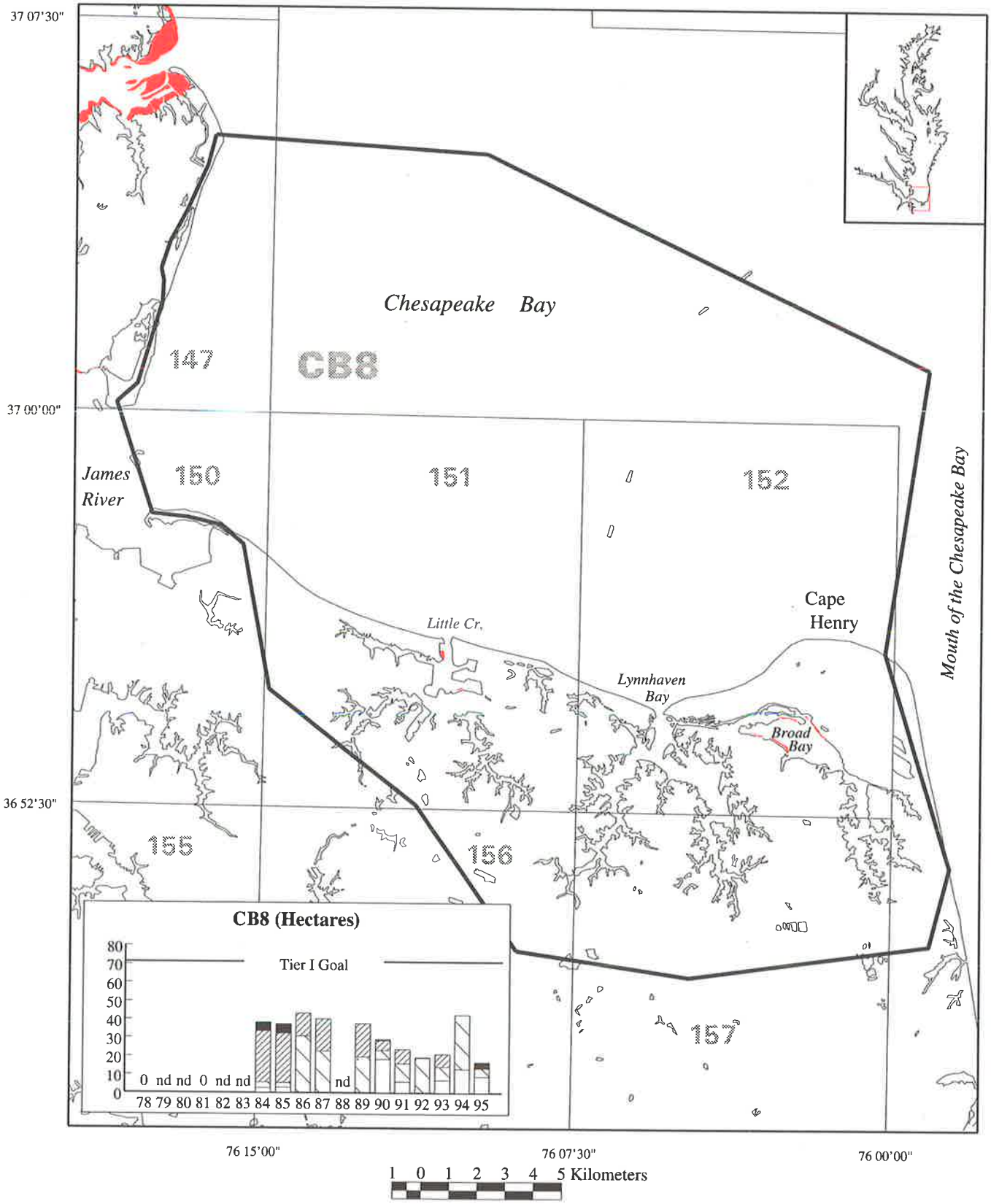

Figure 31: Distribution of SAV in the Mouth of the Chesapeake Bay (Segment CB8) in 1995.

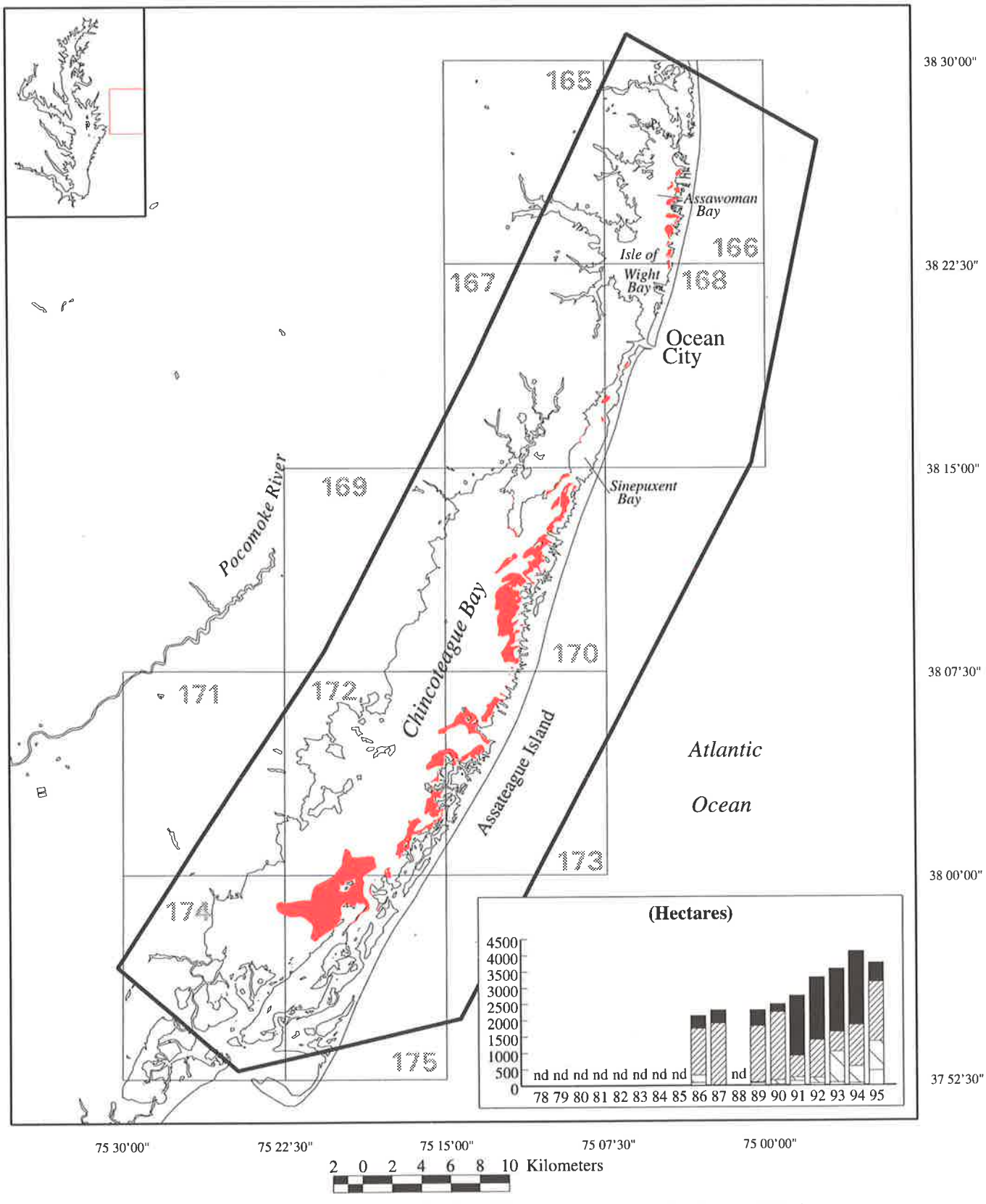

Figure 32: Distribution of SAV in the Chincoteague Bay Section in 1995.

SAV

SAV in Chincoteague and Sinepuxent bays was located along the eastern sides of both the bays, although Sinepuxent Bay had some beds on the western side from Sandy Point to Green Point, and from Grays Point to Fassett Point (Figure 32; Appendix B: Maps 167, 168, 170). SAV was located along the eastern sides of Isle of Wight and Assawoman bays (Figure 32; Appendix B: Maps 166-168).

The VIMS and Citizens' surveys (including the National Park Service and the Ocean Pines Boat Club) reported two species, *Z. marina* and *R. maritima,* from this section. *Zostera marina* and *R. maritima* were found throughout Chincoteague and Sinepuxent bays, as in 1994, while only *R. maritima* was found in Assawoman and Isle of Wight bays (Appendices B and D: Maps 166-168, 170, 172-175). Both *Z. marina* and *R. maritima* were reported in 1994 from Assawoman Bay but there was no groundtruthing from Isle of Wight Bay in 1994 (Orth *et al.*, 1995).

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APPENDICES

APPENDIX A

APPENDIX A

Species of Submerged Aquatic Plants Found in Chesapeake Bay and Tributaries Exclusive of Marine Algae (Classification and Nomenclature Derived from: Godfrey and Wooten, 1979, 1981; Harvill *et al.*, 1977, 1981; Kartesz and Kartesz, 1980; Radford *et al.*, 1968; Wood and Imahori, 1965, 1964)

Family	Species	Common name
Characeae (muskgrass)	*Chara braunii* Gm.	Muskgrass
	Chara zeylanica Klein. ex Willd., em.	Muskgrass
	Nitella flexilis (L). Ag., em.	Stonewort
Potamogetonaceae (pondweed)	*Potamogeton perfoliatus* L. var. *bupleuroides* (Fernald) Farwell	Redhead grass
	Potamogeton epihydrus	Leafy pondweed
	Potamogeton pectinatus L.	Sago pondweed
	Potamogeton crispus L.	Curly pondweed
	Potamogeton pusillus L.	Slender pondweed
Ruppiaceae	*Ruppia maritima* L.	Widgeon grass
Zannichelliaceae	*Zannichellia palustris* L.	Horned pondweed
Najadaceae	*Najas guadalupensis* (Sprengel) Magnus	Southern naiad
	Najas gracillima (A. Braun) Magnus	Slender naiad
	Najas minor Allioni	no common name
	Najas flexilis (Willd.) Rostk. & Schmidt	Northern naiad
Hydrocharitaceae (frogbit)	*Vallisneria americana* Michaux	Wild celery, tapegrass
	Elodea canadensis (Michaux)	Common elodea
	Egeria densa Planchon	Water-weed
	Hydrilla verticillata (L.f.) Boyle	Hydrilla
Pontederiaceae (pickerelweed)	*Heteranthera dubia* (Jacquin) MacMillian	Water stargrass
Ceratophyllaceae (coontail)	*Ceratophyllum demersum* L.	Coontail
Trapaceae	*Trapa natans* L.	Water chestnut
Haloragaceae (watermilfoil)	*Myriophyllum spicatum* L.	Eurasian watermilfoil
Zosteraceae	*Zostera marina* (L.)	Eelgrass

APPENDIX B

USGS 7.5 Minute Quadrangles for Chesapeake Bay and Chincoteague Bay Showing Distribution, Abundance, and Ground Truthing of SAV in 1995. [Boundaries of Individual SAV Beds Are Delineated by Solid Lines and SAV Beds Are Shaded. Each Bed Is Identified with an Unique One or Two Letter (A-Z, AA-ZA, AB-ZB, etc.) and One Number (1-4) Designation. These Numbers Represent the Density Classification Discussed in the Text and Figure 8, i.e., 1 = <10%; 2 = 10-40%; 3 = 40-70%; 4 = 70-100%. Ground Truthing is Represented by Symbols and Species Codes which Are Explained in the Legend. Dashed Lines Represent Chesapeake Bay Program Segment Boundaries. Chesapeake Bay Program Segments Are Identified by Chesapeake Bay Program Segment Code Designations.]

Key for 1995 SAV Maps

SPECIES

Zm *Zostera marina* (eelgrass)

Rm *Ruppia maritima* (widgeon grass)

C *Chara* sp. (muskgrass)

Cd *Ceratophyllum demersum* (coontail)

Ec *Elodea canadensis* (common elodea)

Ed *Egeria densa* (water-weed)

Hd *Heteranthera dubia* (water stargrass)

Hv *Hydrilla verticillata* (hydrilla)

Ms *Myriophyllum spicatum* (Eurasian watermilfoil)

N *Najas* sp. (naiad)

Nfl *Najas flexilis* (northern naiad)

Ngr *Najas gracillima* (slender naiad)

Ngu *Najas guadalupensis* (southern naiad)

Nm *Najas minor*

Nt *Nitella* sp. (muskgrass)

Pcr *Potamogeton crispus* (curly pondweed)

Pe *Potamogeton epihydrus* (leafy pondweed)

Ppc *Potamogeton pectinatus* (sago pondweed)

Ppf *Potamogeton perfoliatus* (redhead-grass)

Ppu *Potamogeton pusillus* (slender pondweed)

Tn *Trapa natans* (water chestnut)

Va *Vallisneria americana* (wild celery)

Zp *Zannichellia palustris* (horned pondweed)

U Unknown species composition

SURVEY STATIONS

◍ Citizens Field Observation

◗ U.S. EPA

× Harford Community College

♥ Patuxent River Park

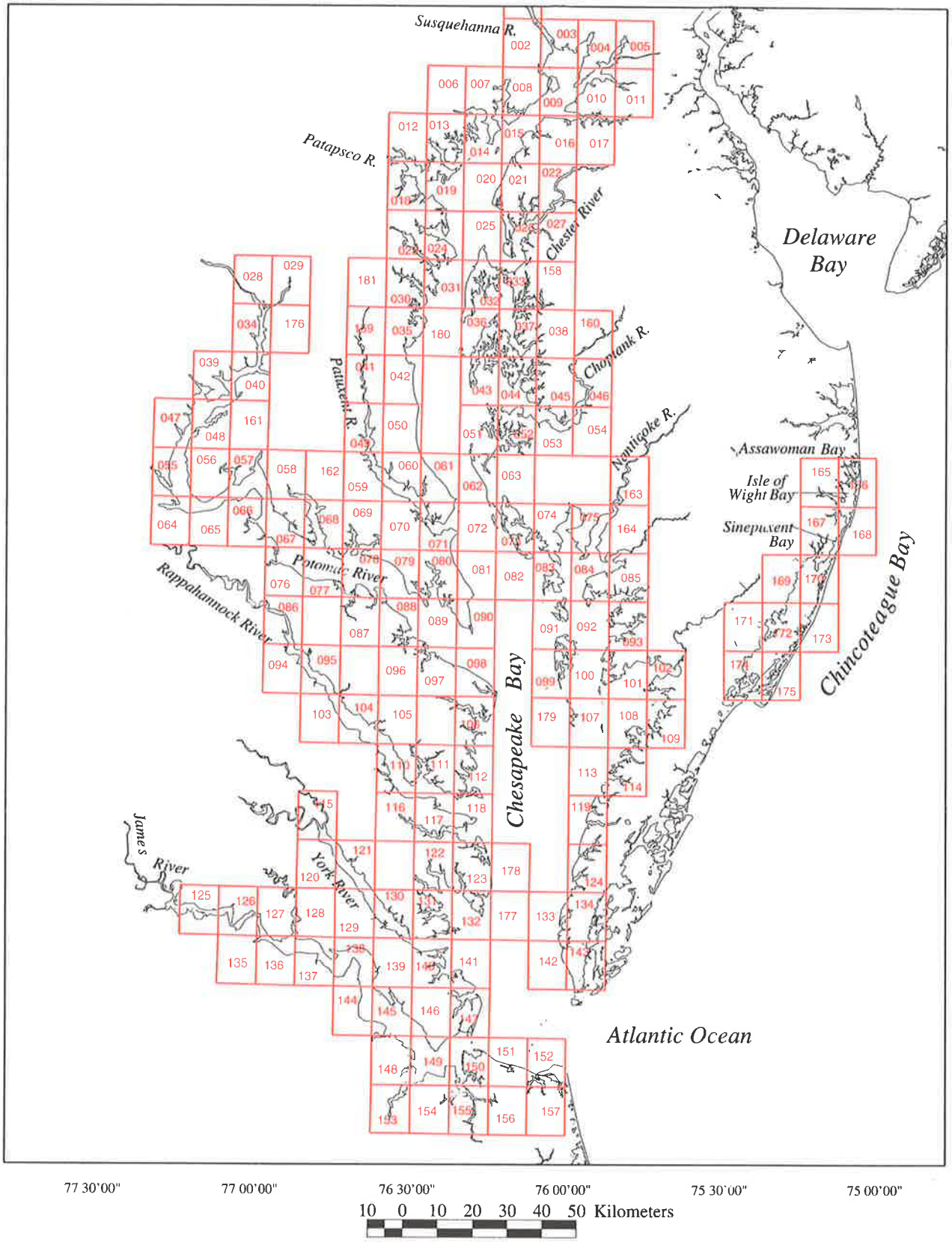
★ U.S. Fish and Wildlife Service

◊ U.S. Geological Survey

⩓ VIMS Field Survey

1995 SAV Beds

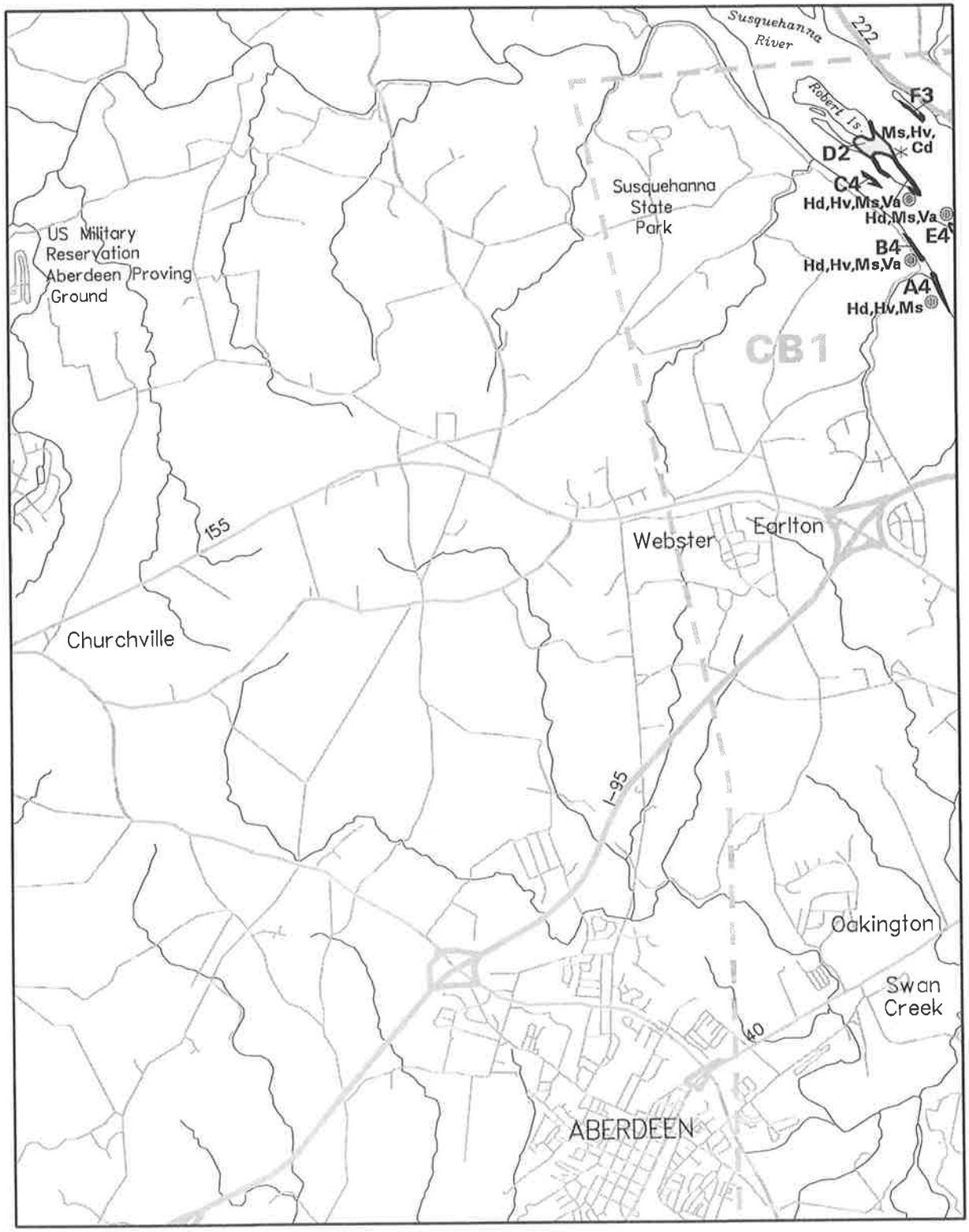
Quadrangle Locator Key



Location of USGS 7.5 minute quadrangles in Chesapeake Bay, its tributaries, and in Chincoteague Bay with corresponding code numbers. (See Table 2 for quad names.)

Submerged Aquatic Vegetation 1995

Aberdeen, Md. (002)



1000 0 1000 2000 meters

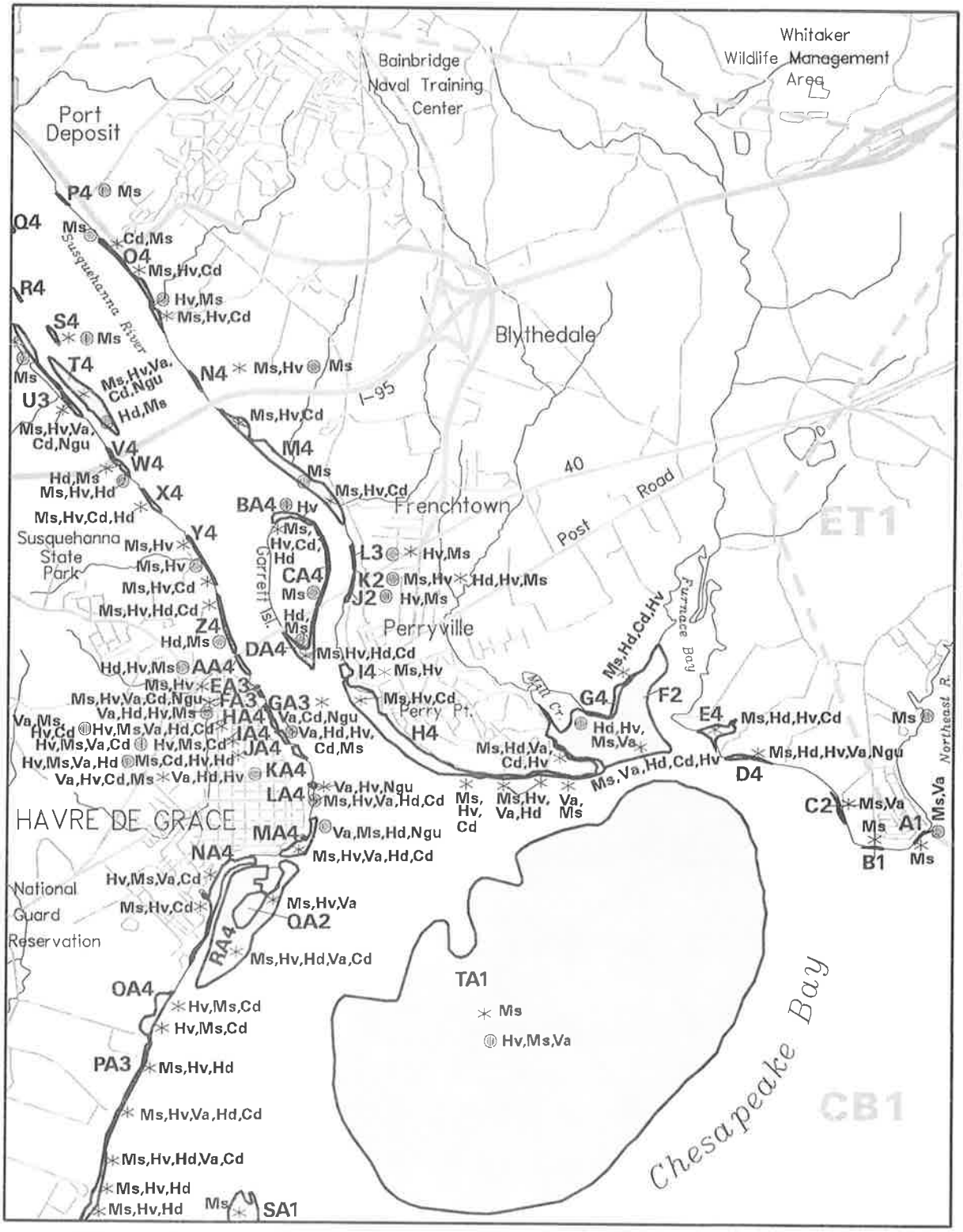
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 10/13/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(003) Havre de Grace, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 10/13/95

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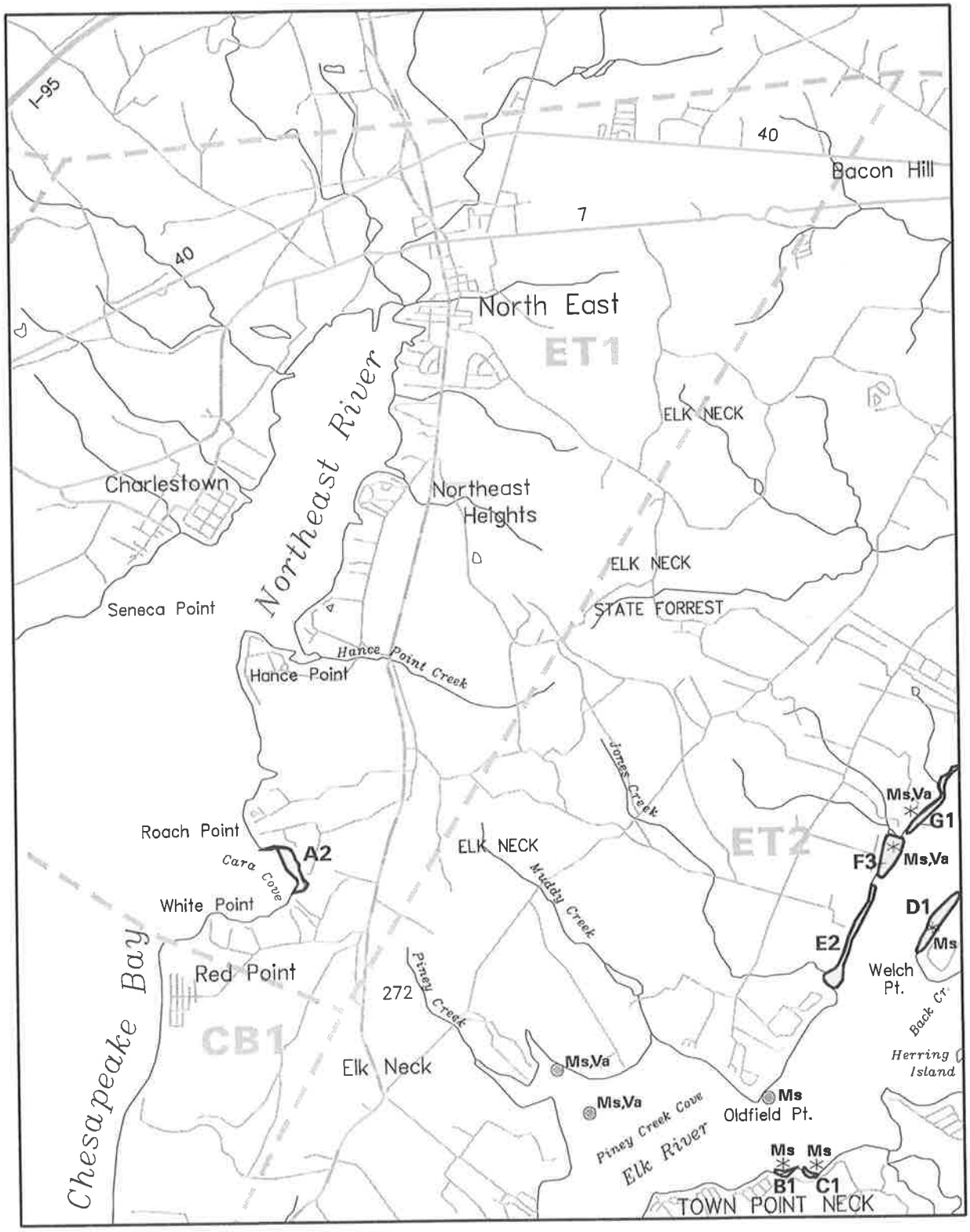
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

North East, Md. (004)



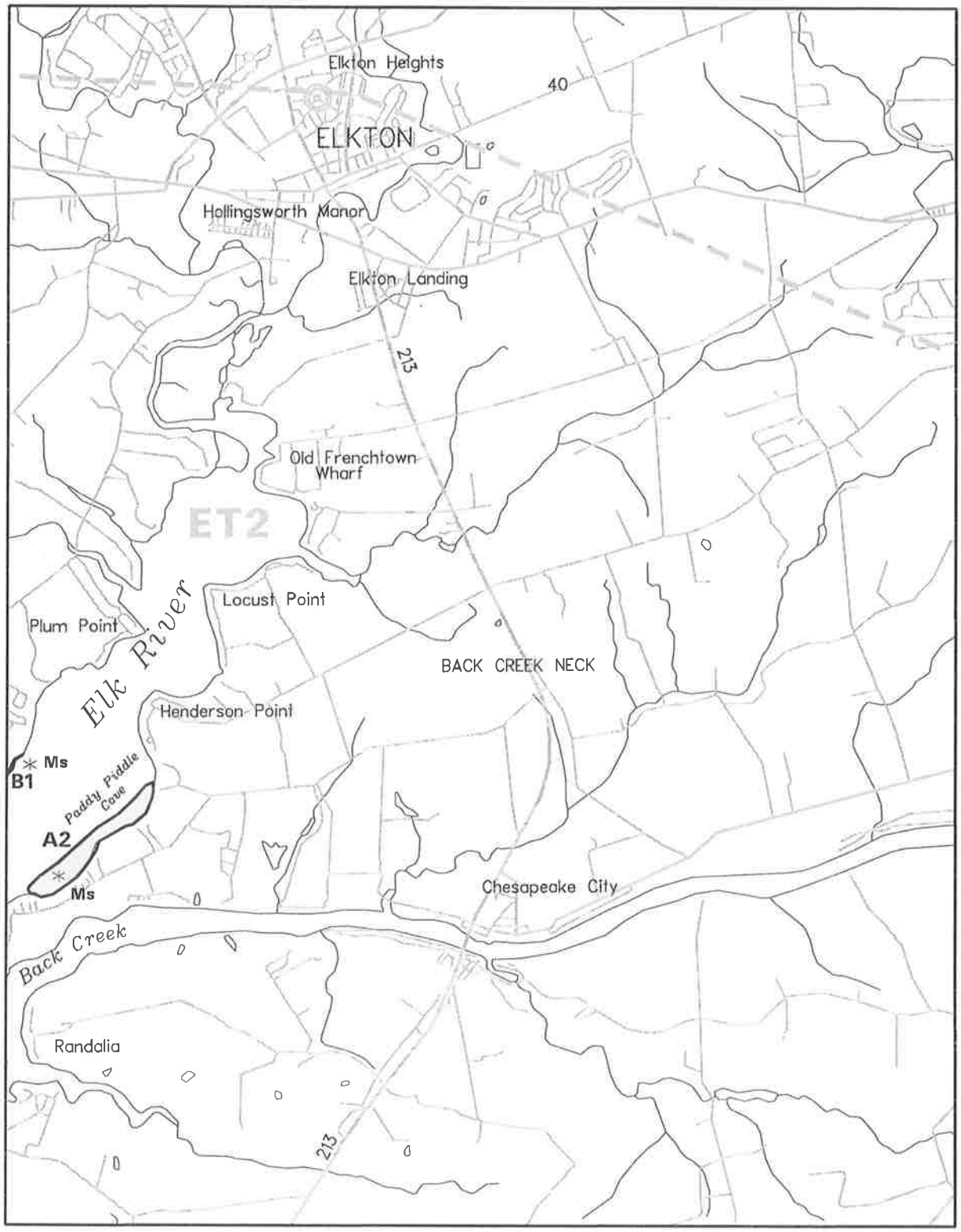
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 10/13/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(005) Elkton, Md.–Del.



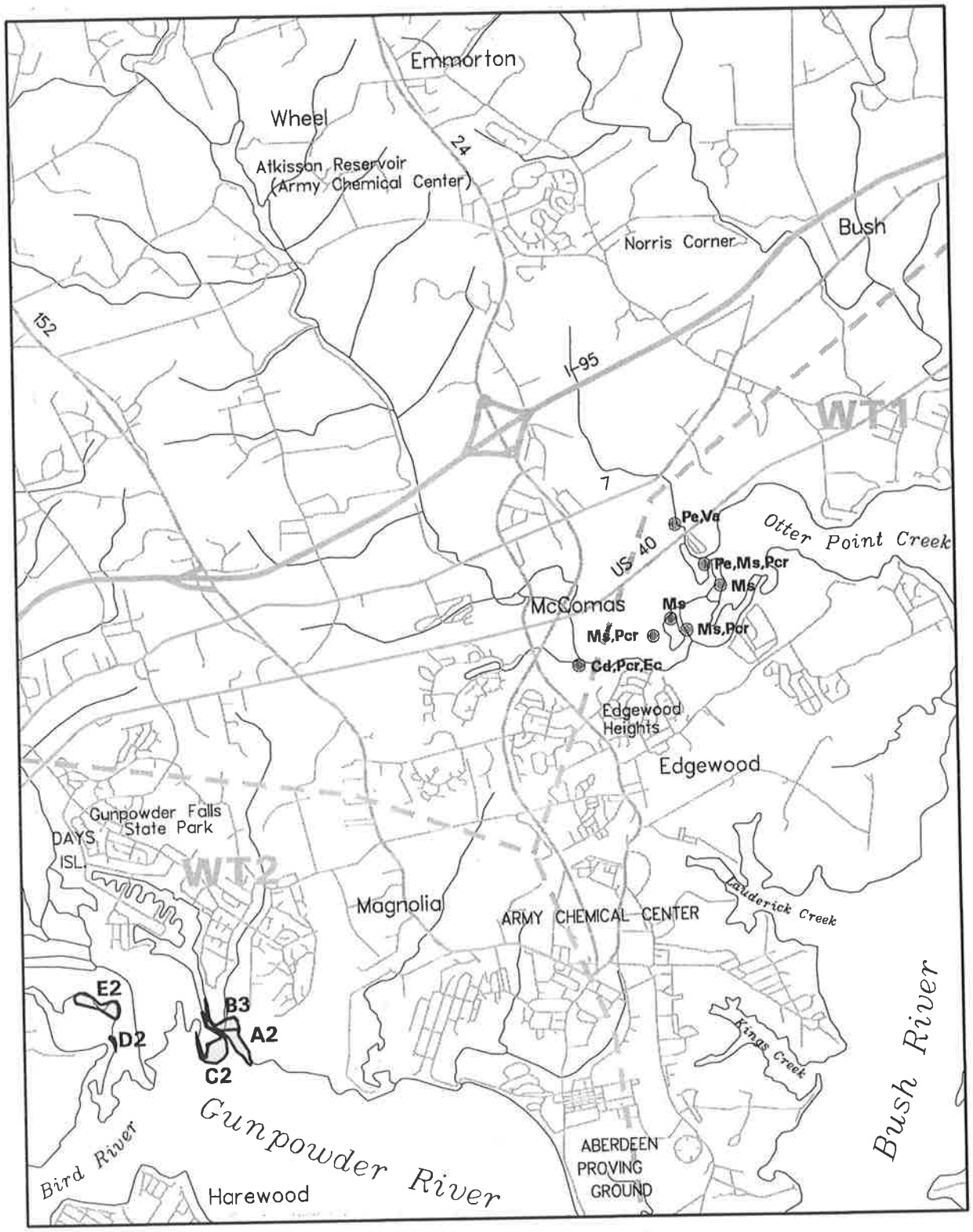
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 10/13/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Edgewood, Md. (007)



1000 0 1000 2000 meters

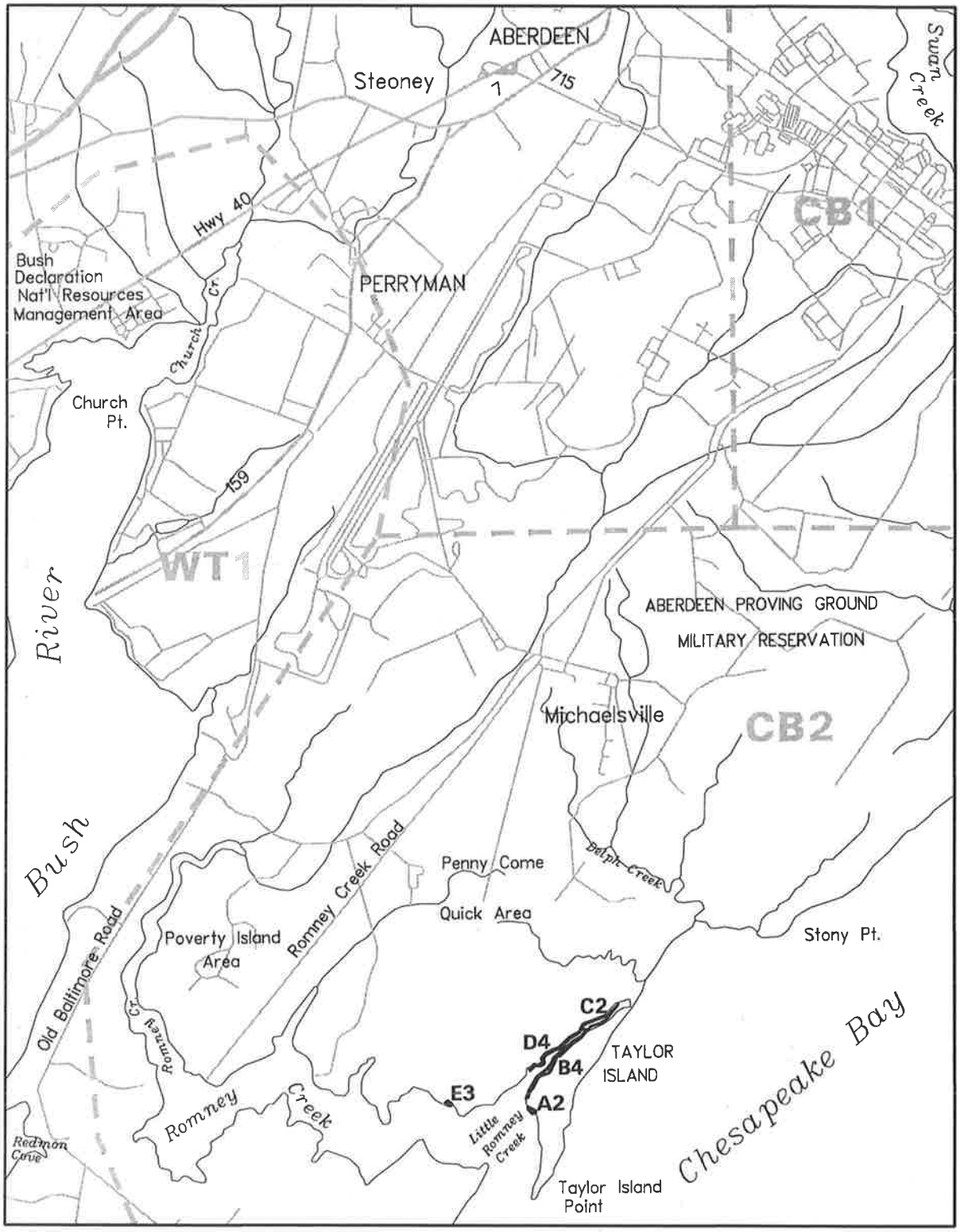
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(008) Perryman, Md.



1000 0 1000 2000 meters

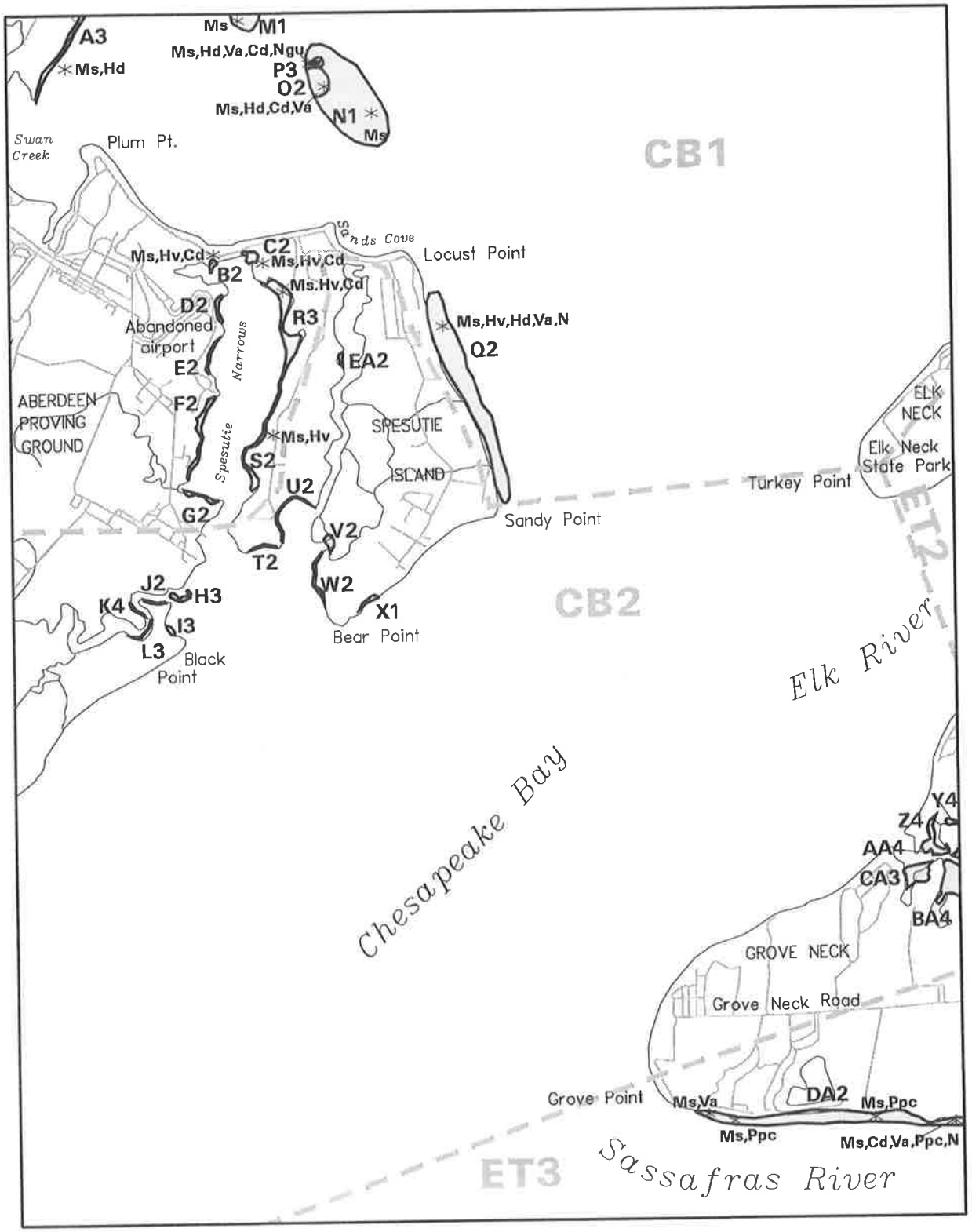
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 10/13/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Spesutie, Md. (009)



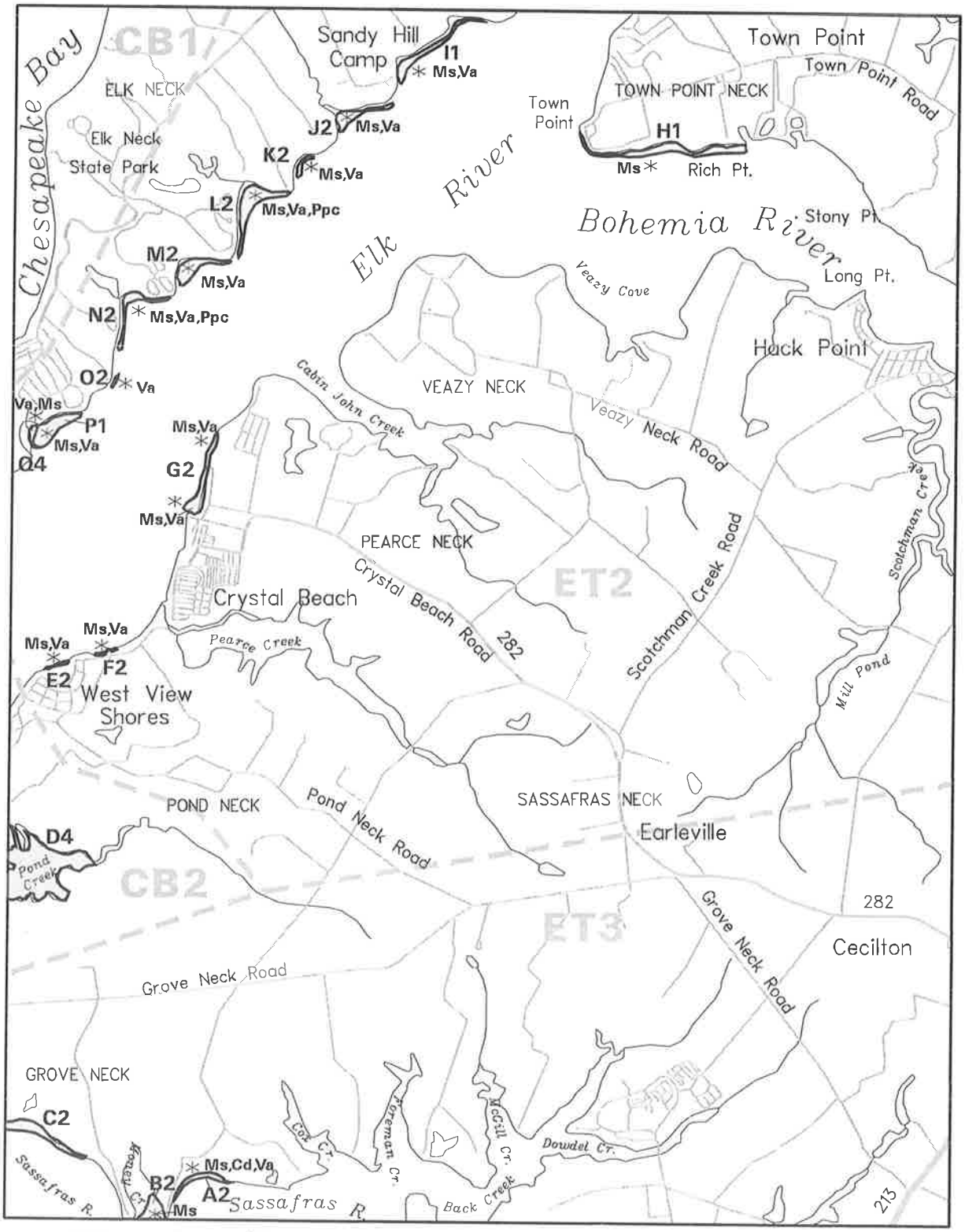
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 10/13/95, 08/04/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(010) Earleville, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 10/13/95

Produced by:
School of Marine Science
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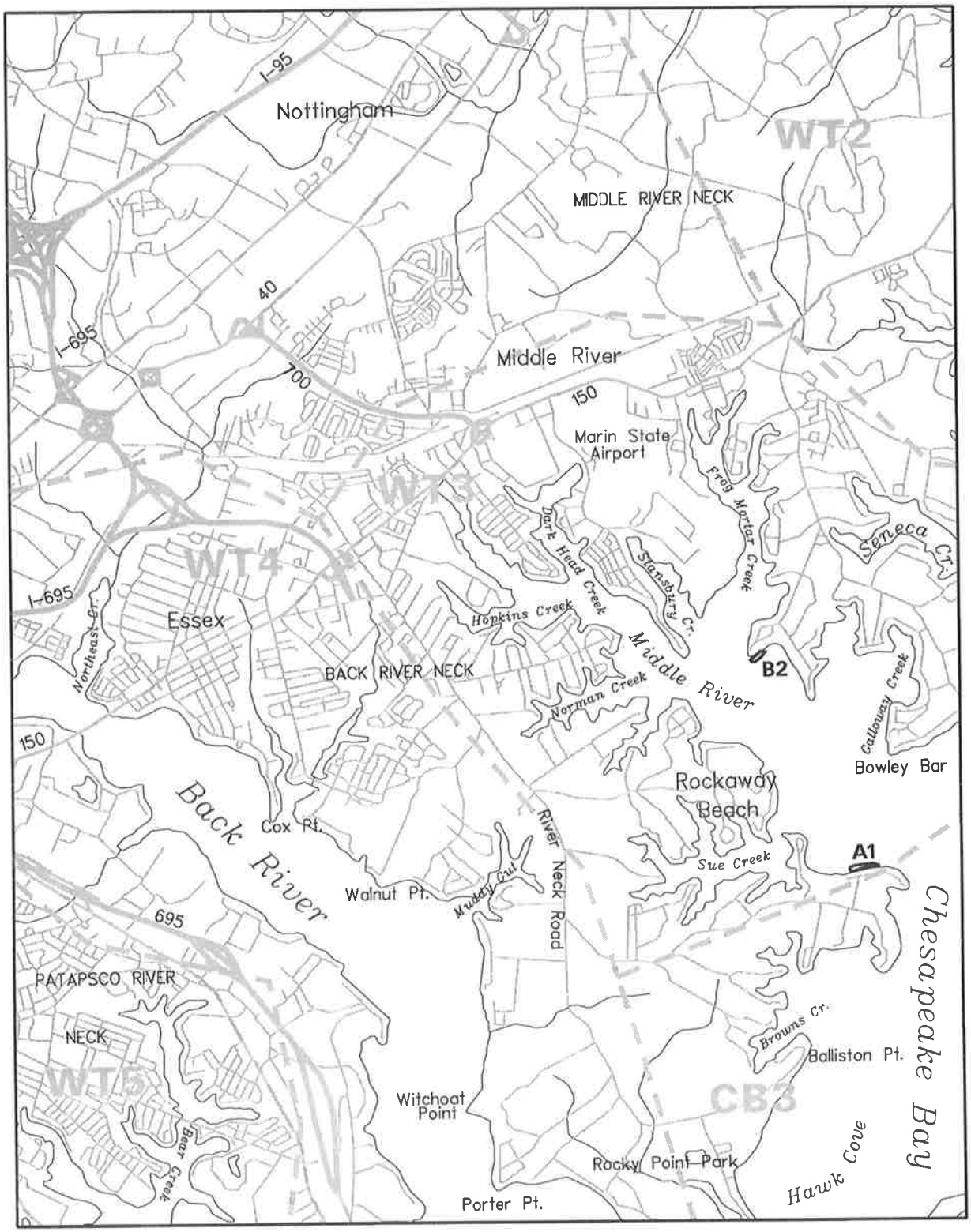
College of William and Mary

Submerged Aquatic Vegetation 1995

Middle River, Md. (013)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
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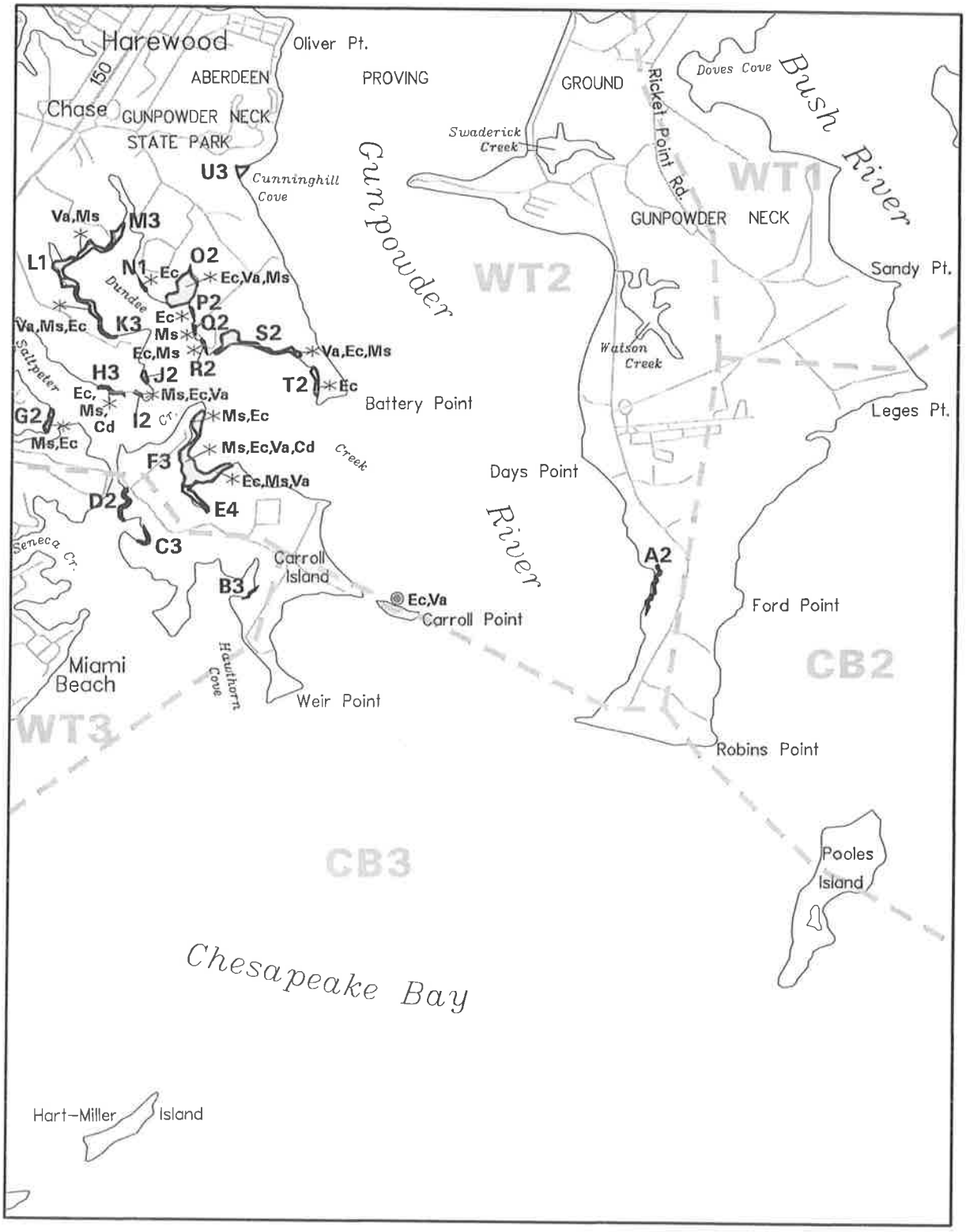
College of William and Mary

Submerged Aquatic Vegetation 1995

(014) Gunpowder Neck, Md.



1000 0 1000 2000 meters

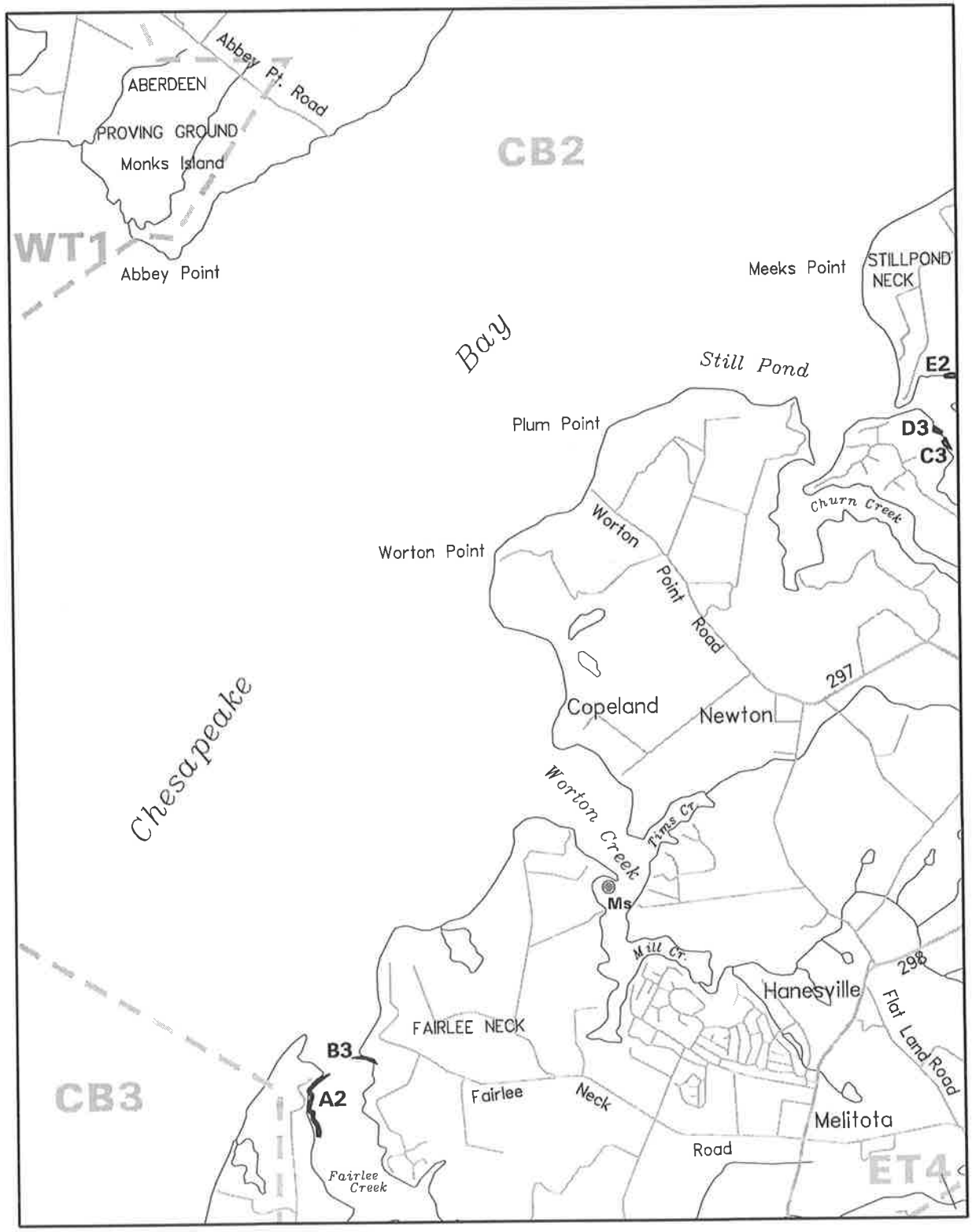
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Hanesville, Md. (015)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95

Produced by:
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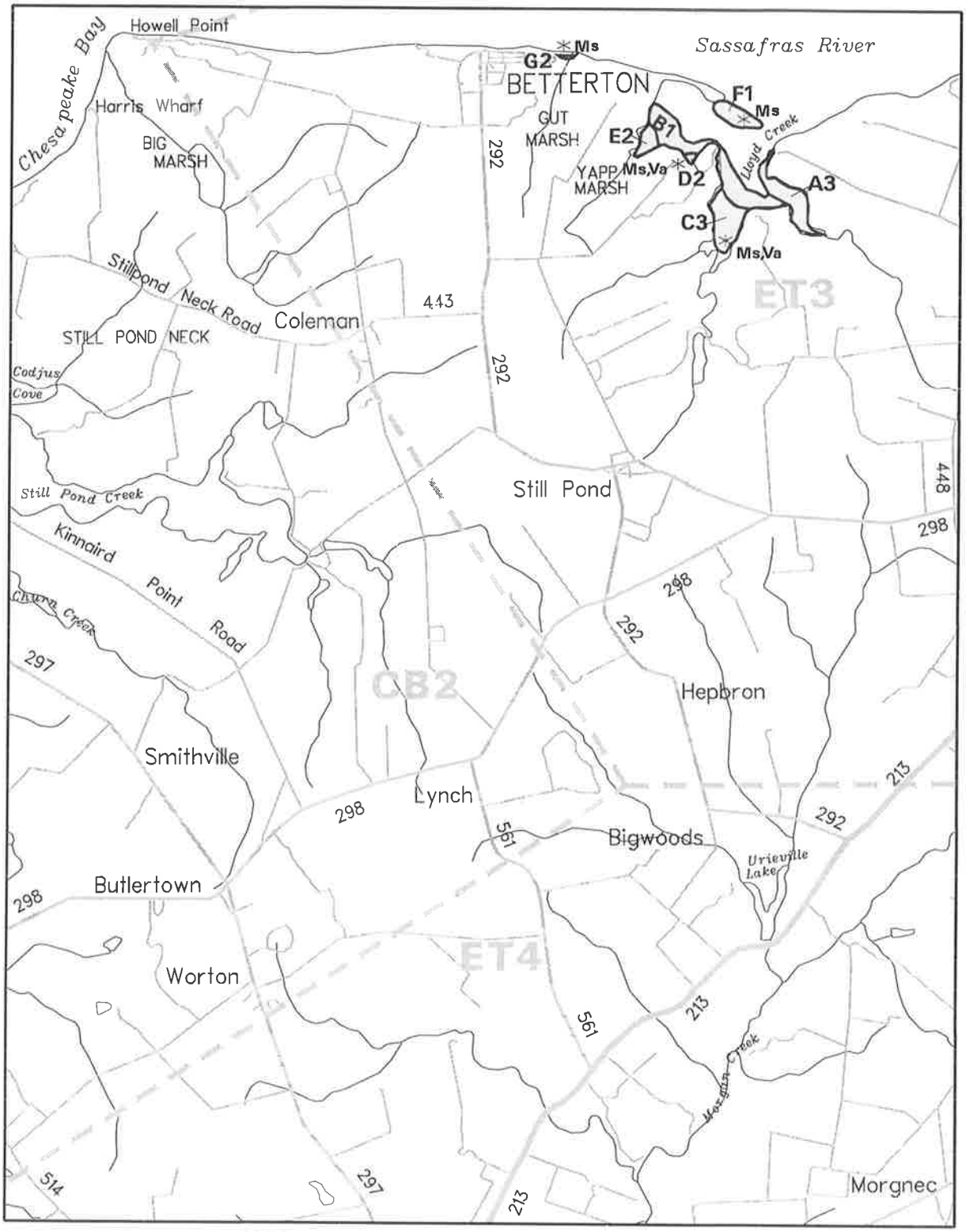
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(016) Betterton, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 08/04/95

Produced by:
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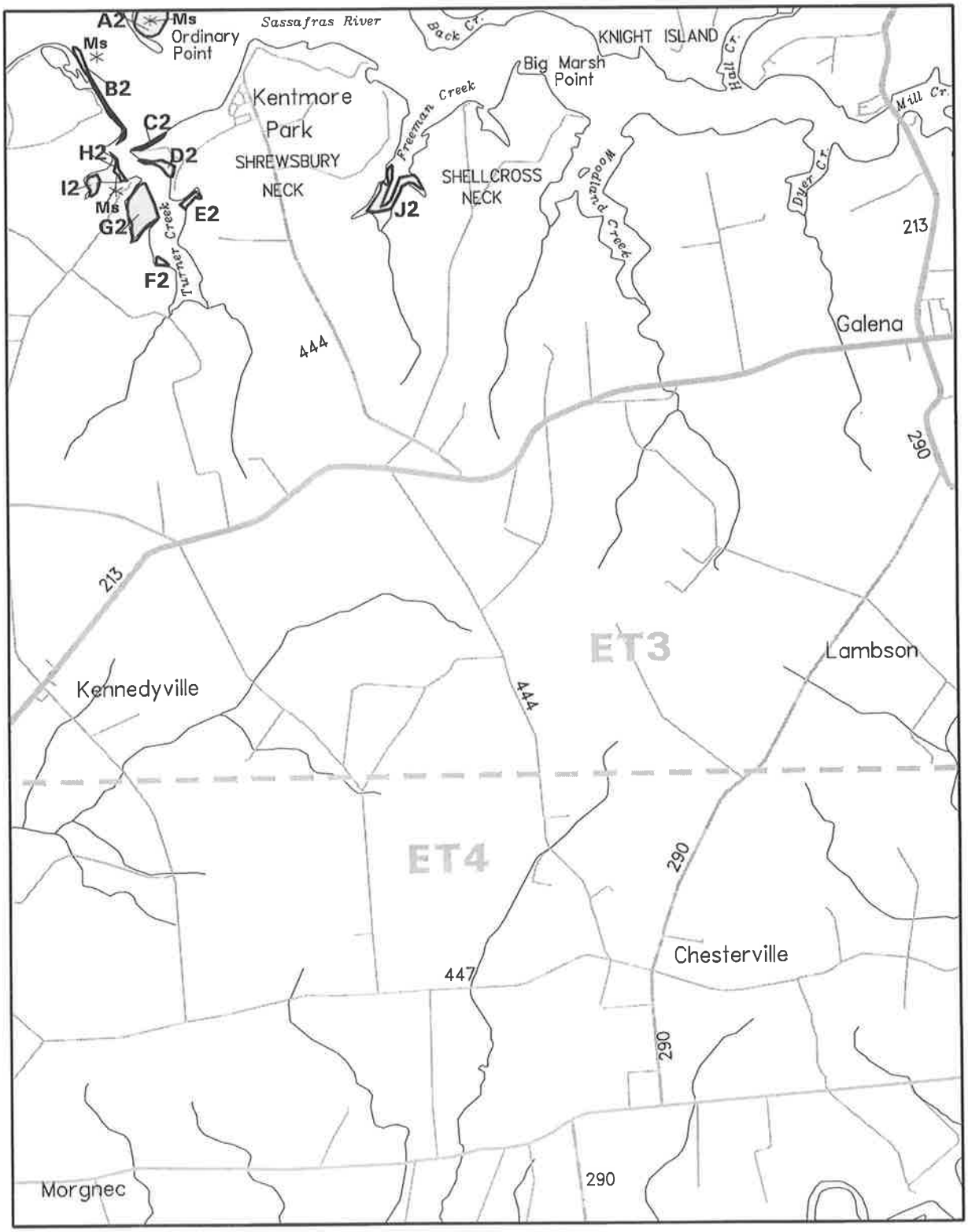
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Galena, Md. (017)



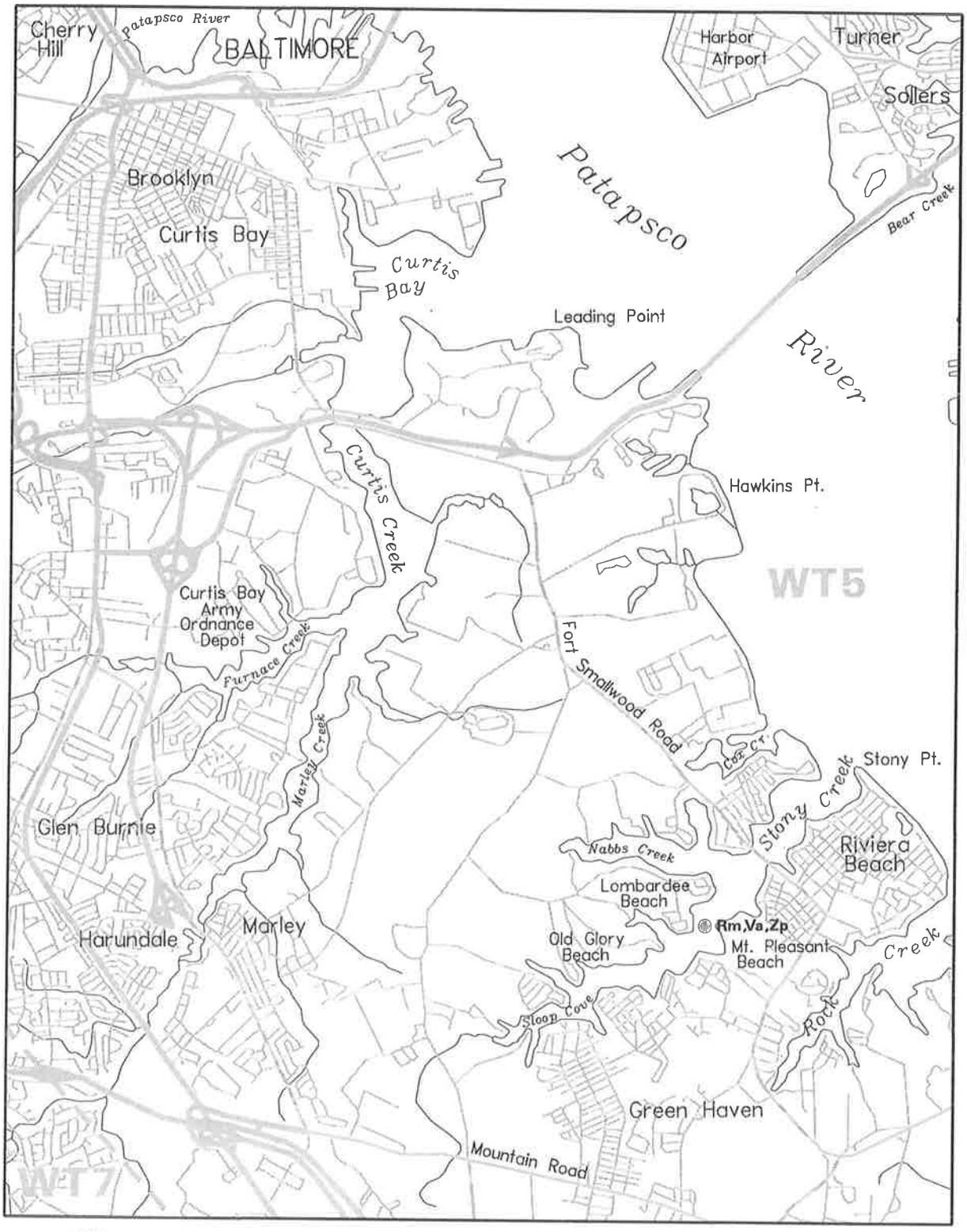
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/04/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(018) Curtis Bay, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/19/95

Produced by:
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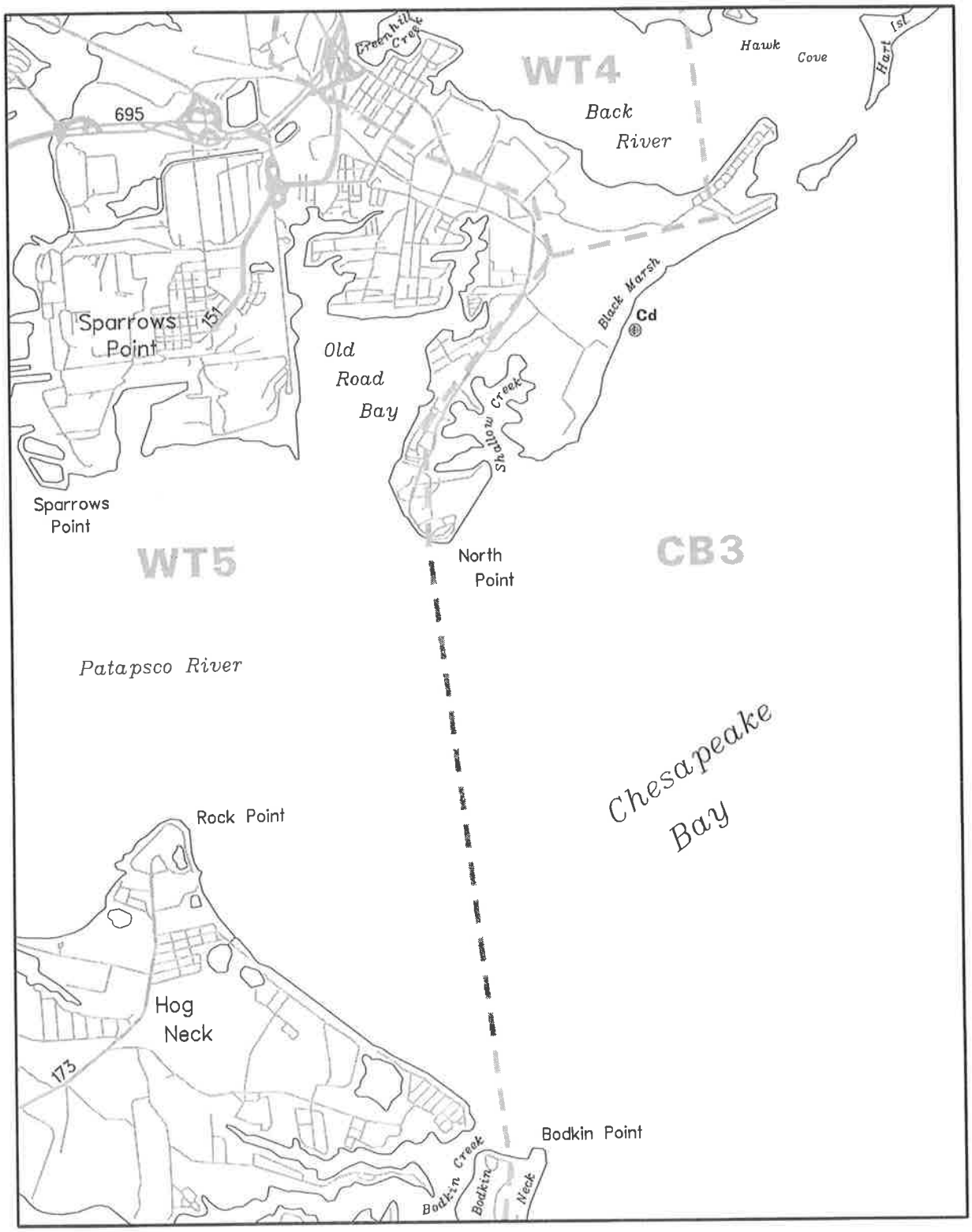
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Sparrows Point, Md. (019)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/09/95

Produced by:
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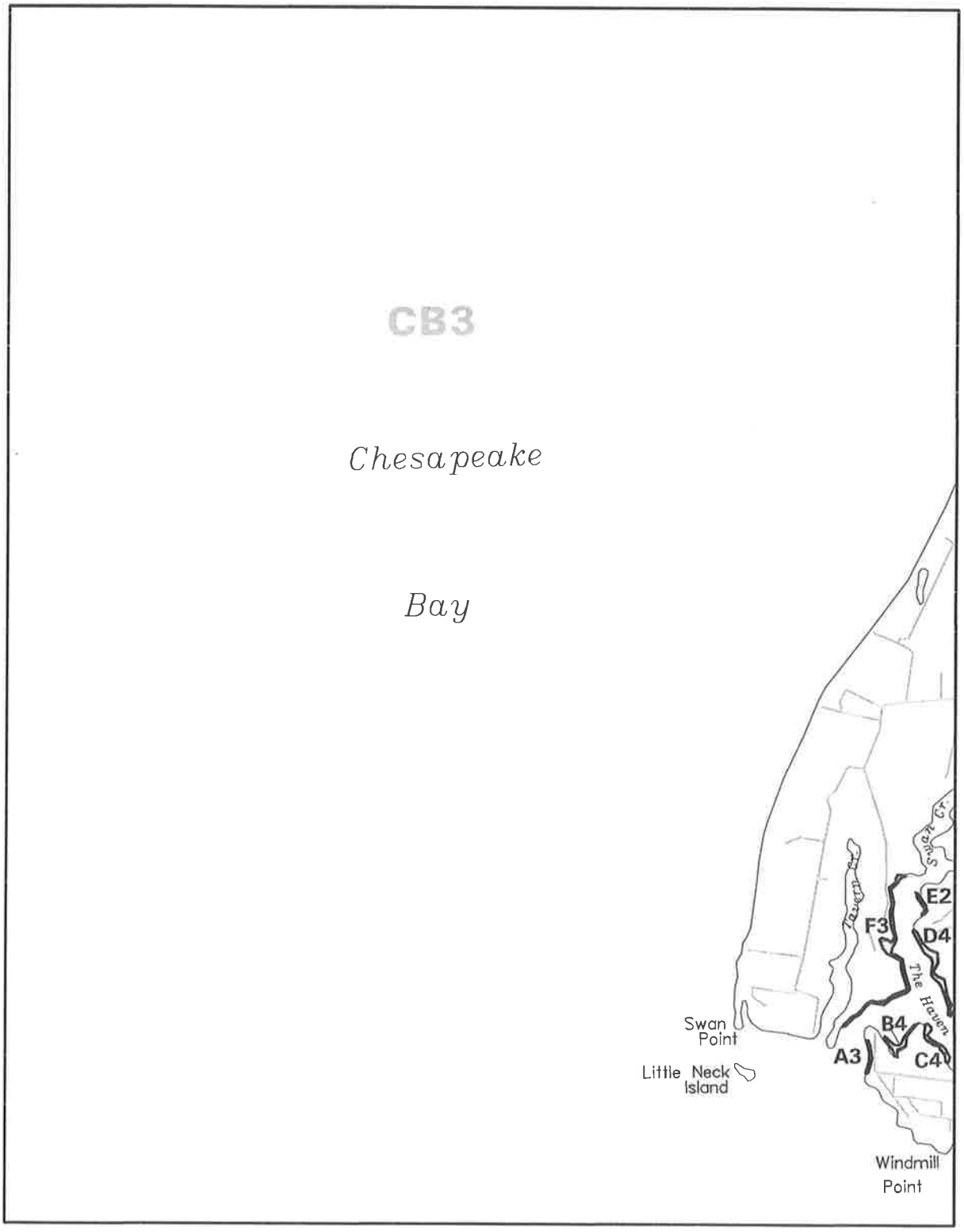
College of William and Mary

Submerged Aquatic Vegetation 1995

(020) Swan Point, Md.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95, 10/13/95

Produced by:
School of Marine Science
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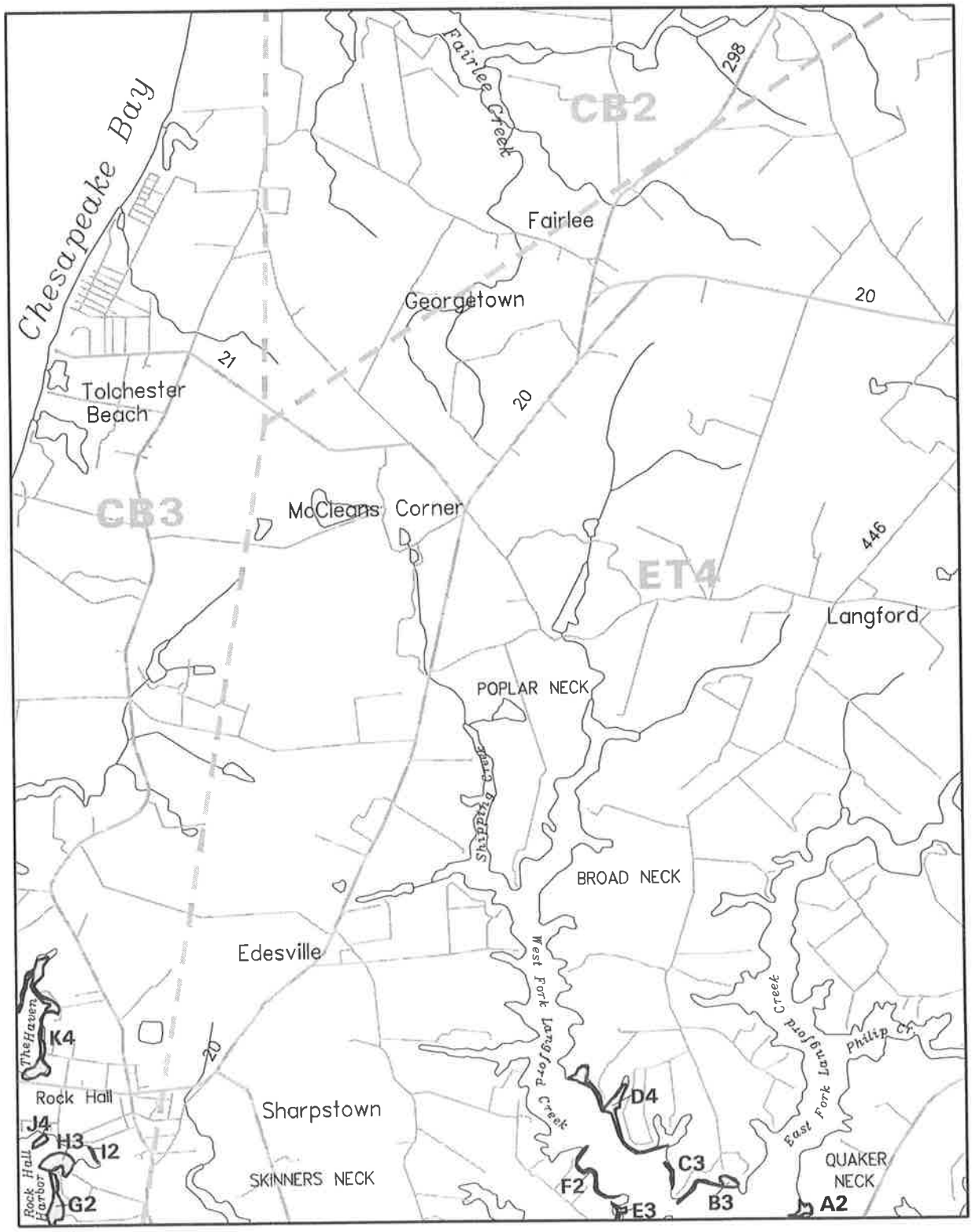
College of William and Mary

Submerged Aquatic Vegetation 1995

Rock Hall, Md. (021)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95, 10/13/95

Produced by:
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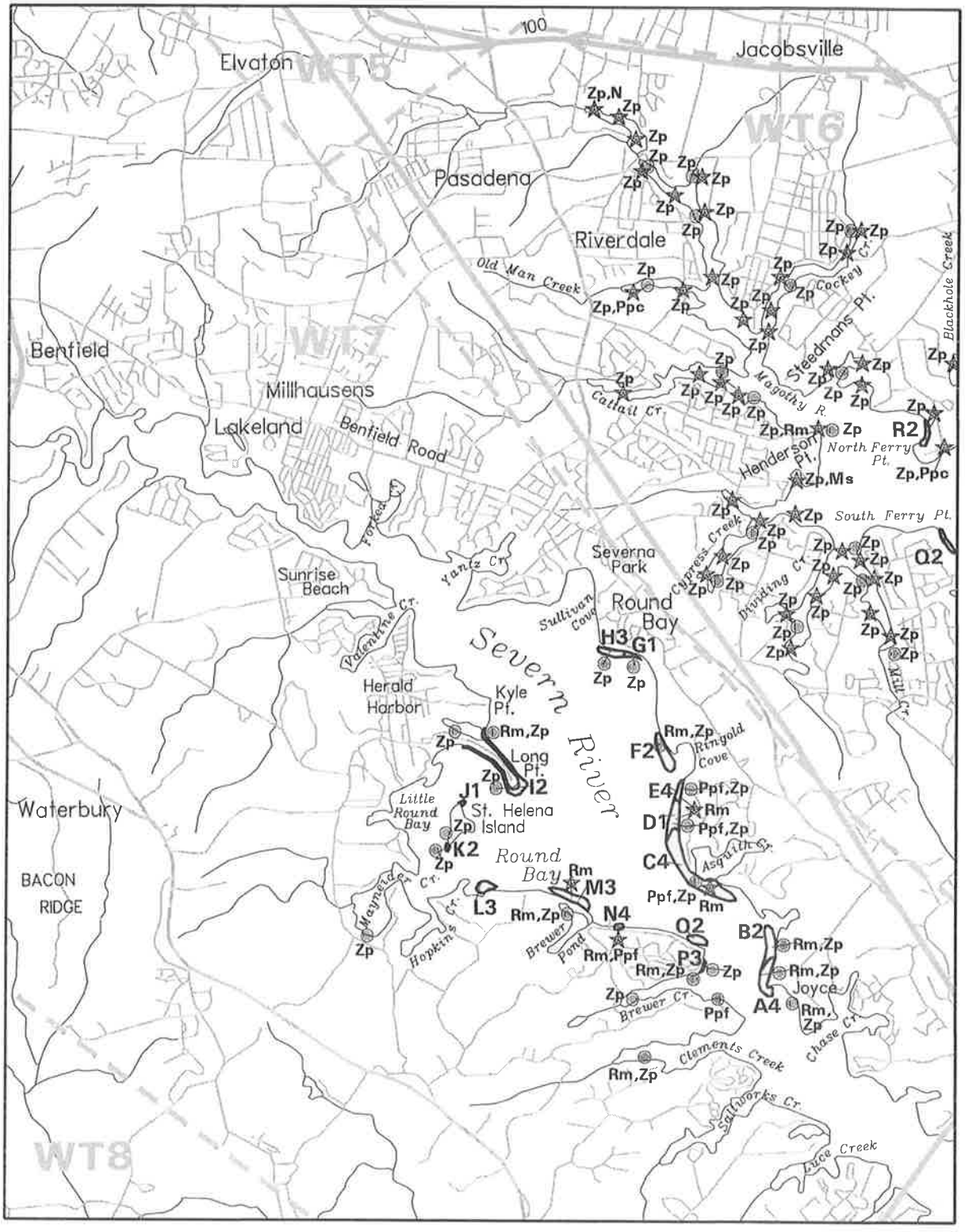
College of William and Mary

Submerged Aquatic Vegetation 1995

(023) Round Bay, Md.



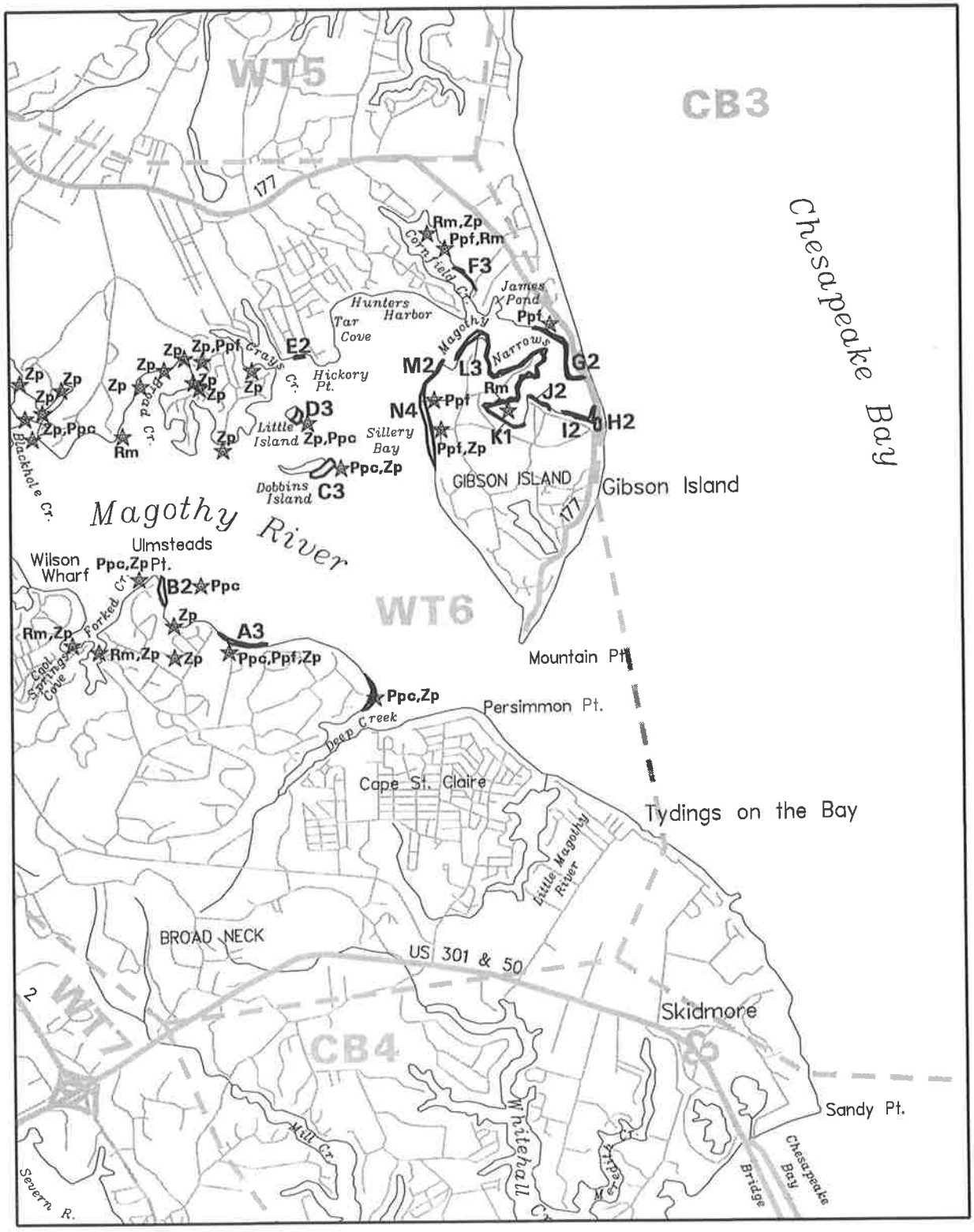
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/19/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Gibson Island, Md. (024)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95

Produced by:
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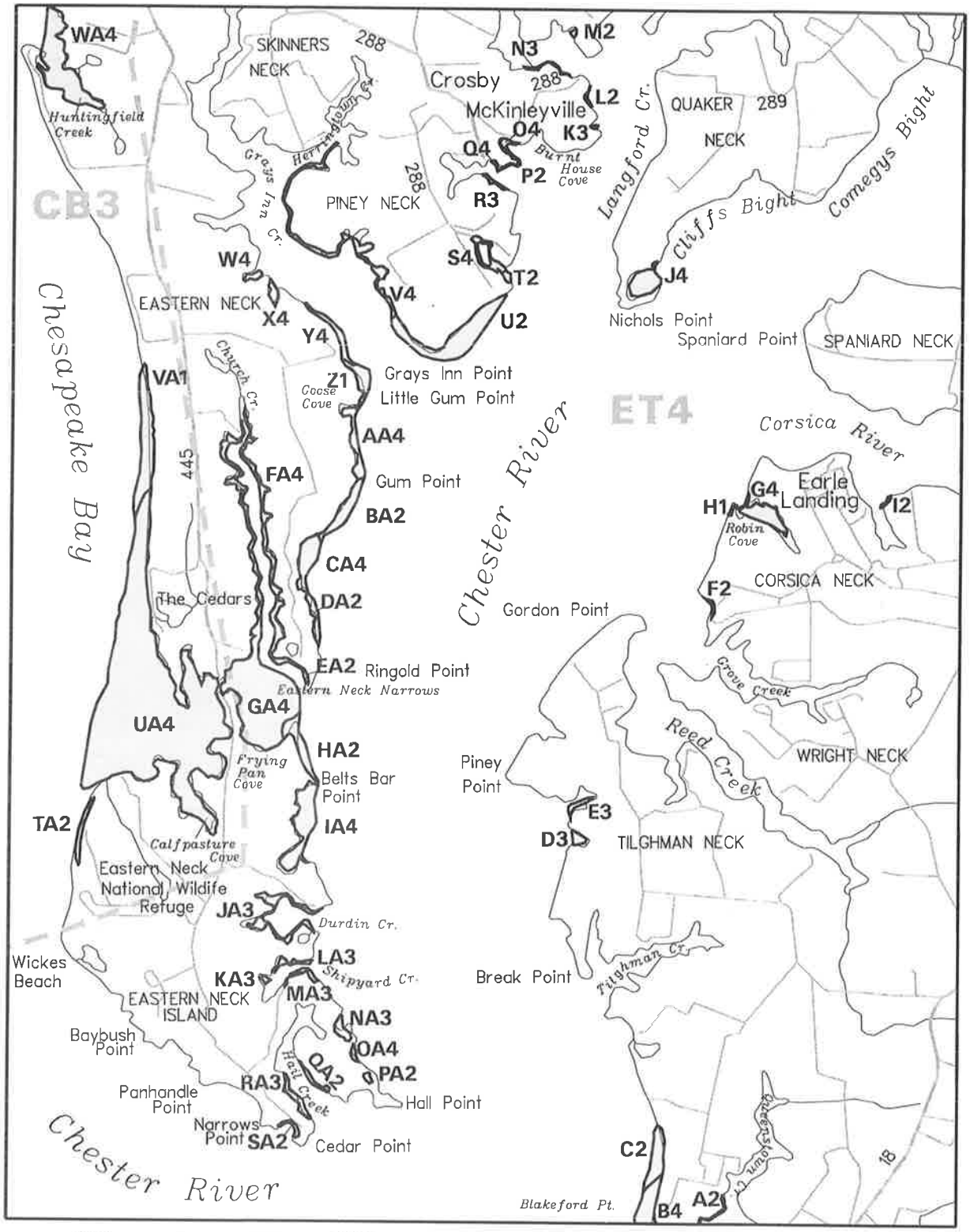
College of William and Mary

Submerged Aquatic Vegetation 1995

(026) Langford Creek, Md.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/19/95, 10/13/95

Produced by:
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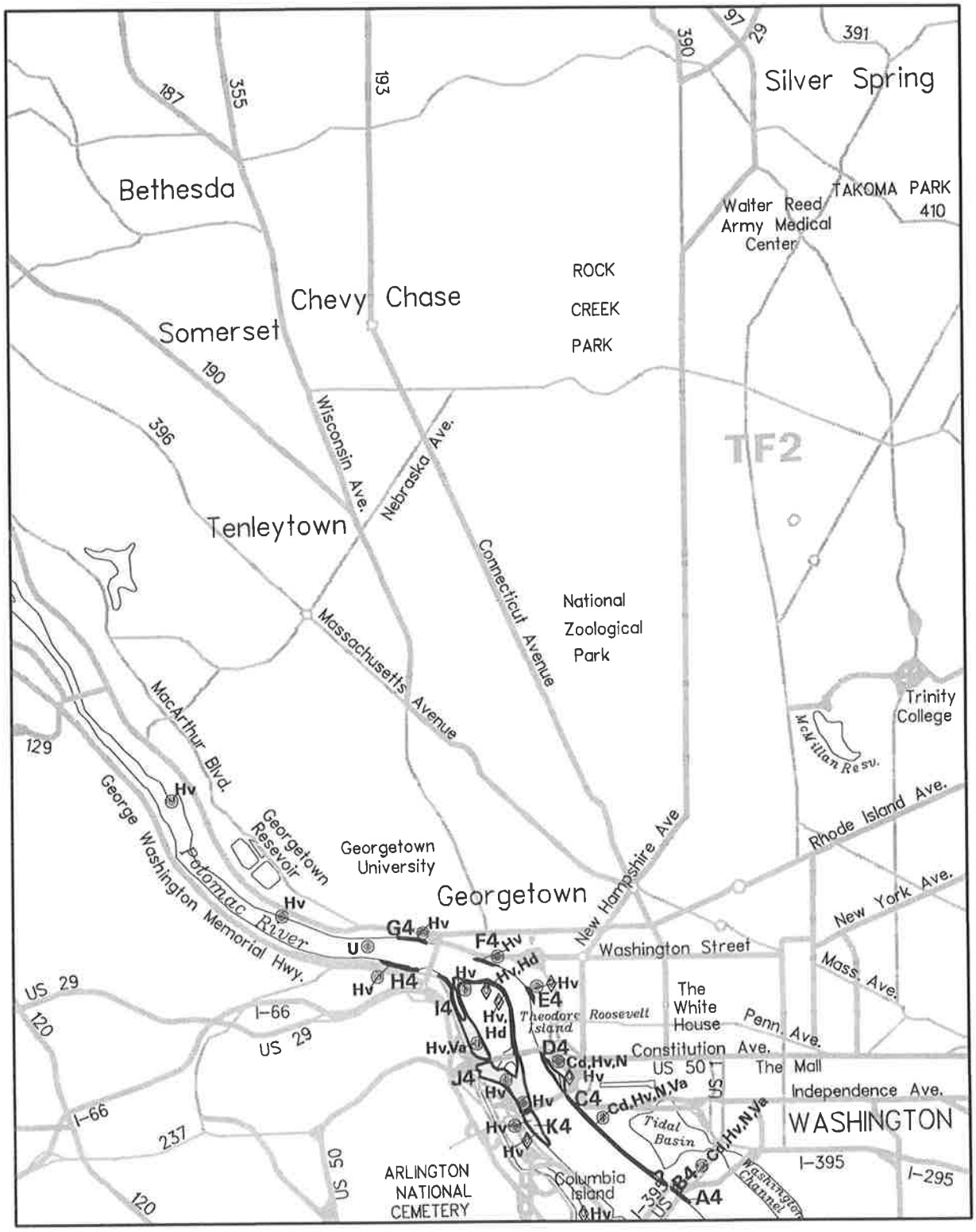
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Washington West, Md.–D.C.–Va (028)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
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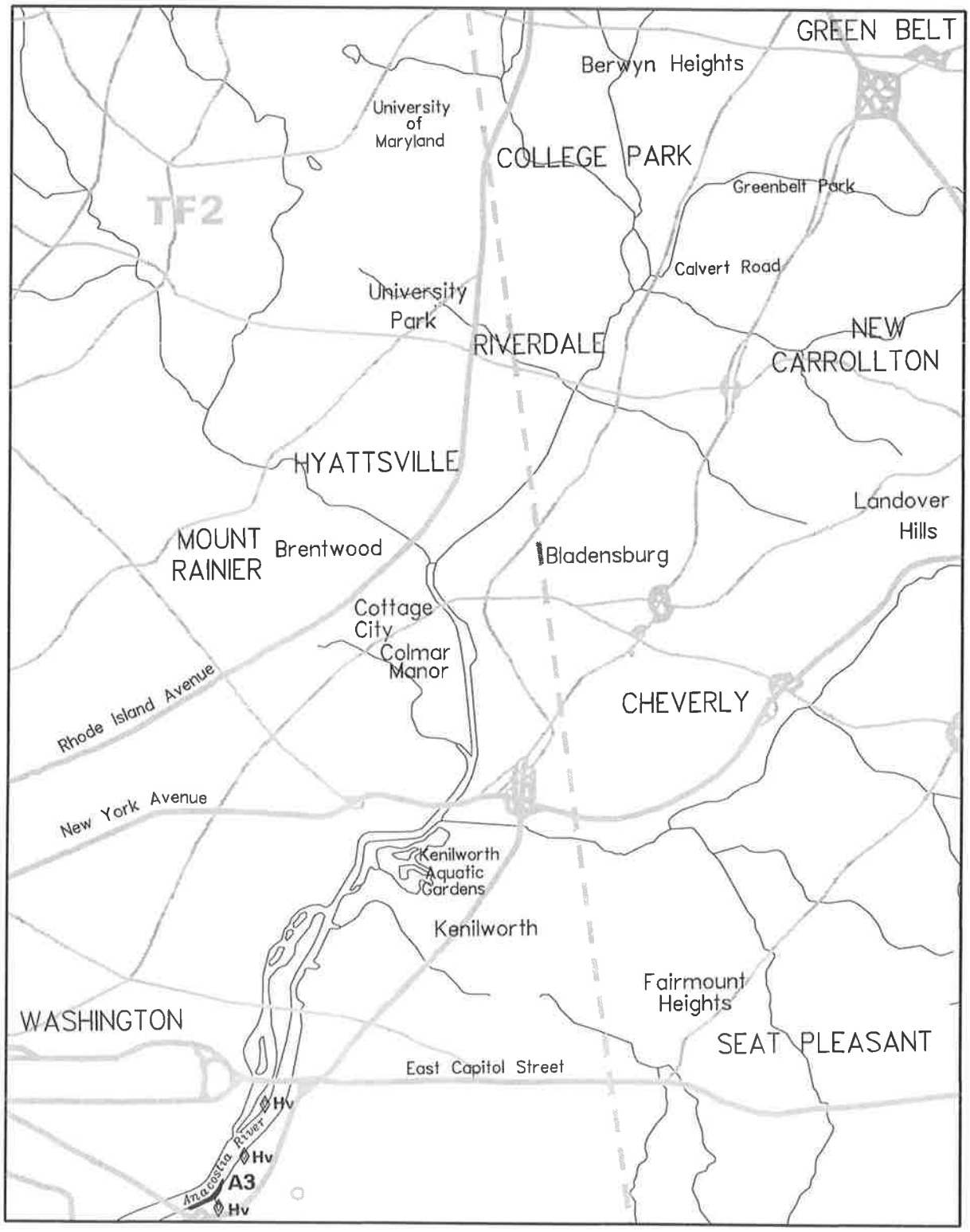
College of William and Mary

Submerged Aquatic Vegetation 1995

(029) Washington East, D.C.–Md.



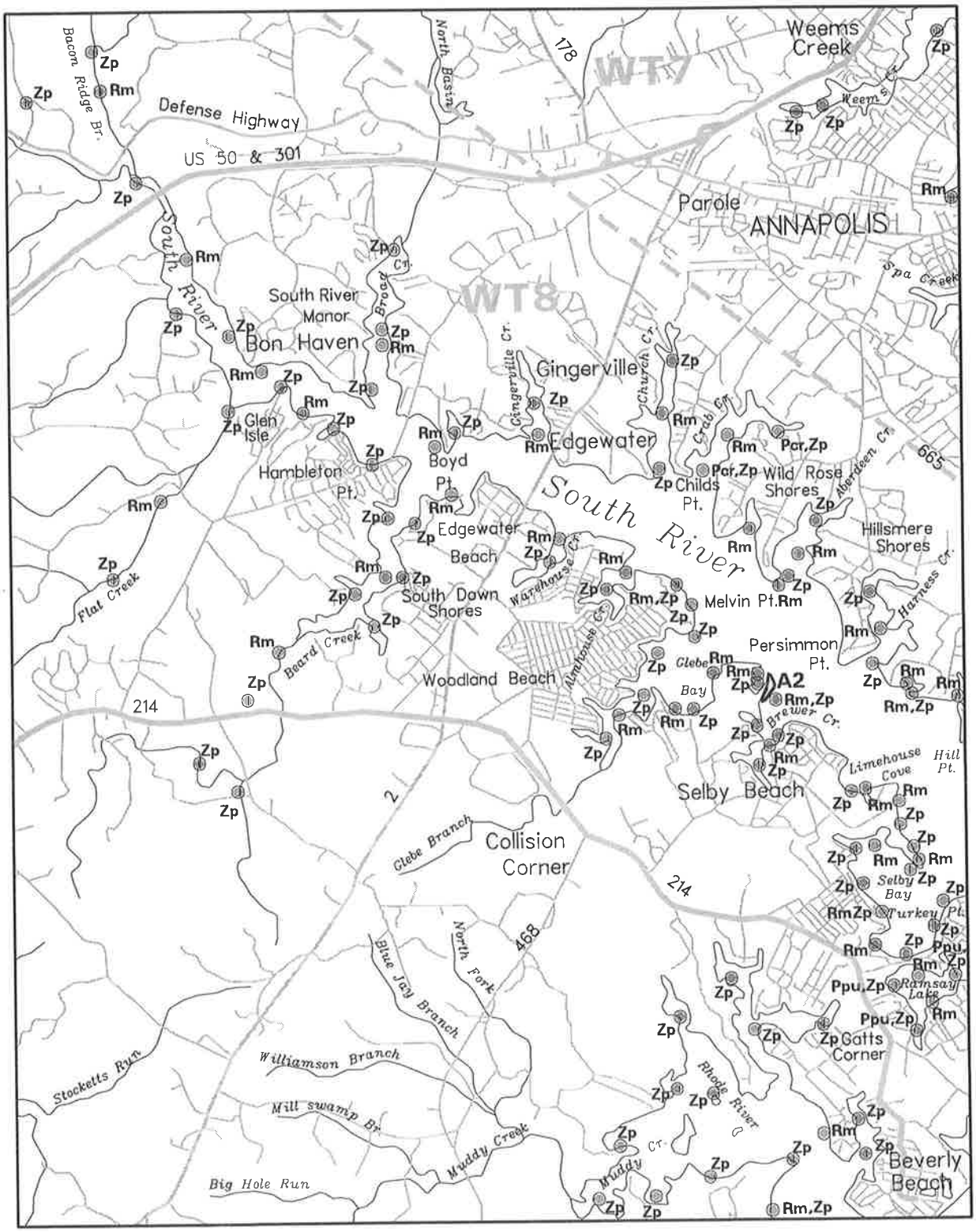
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

South River, Md. (030)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95

Produced by:
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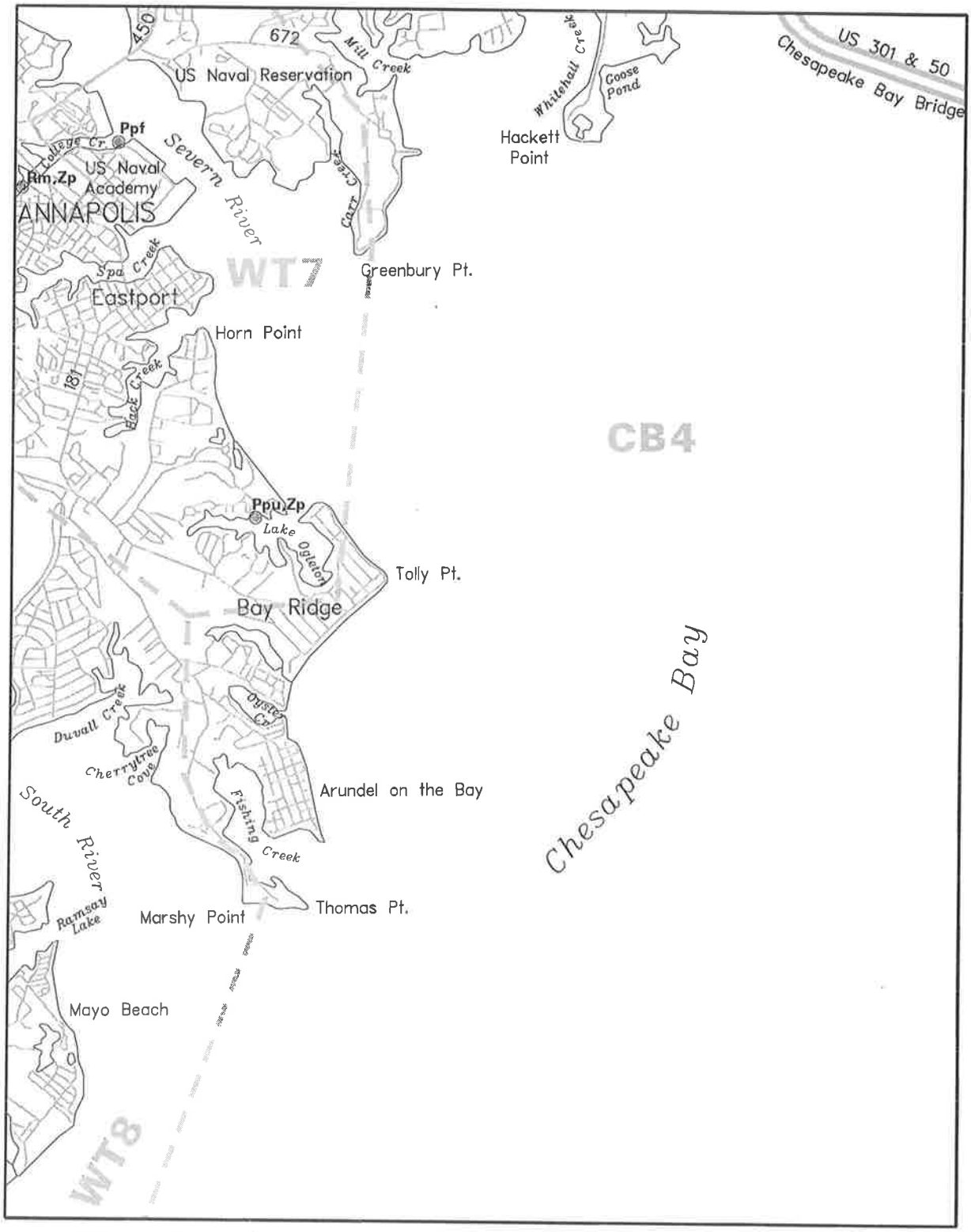
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(031) Annapolis, Md.



1000 0 1000 2000 meters

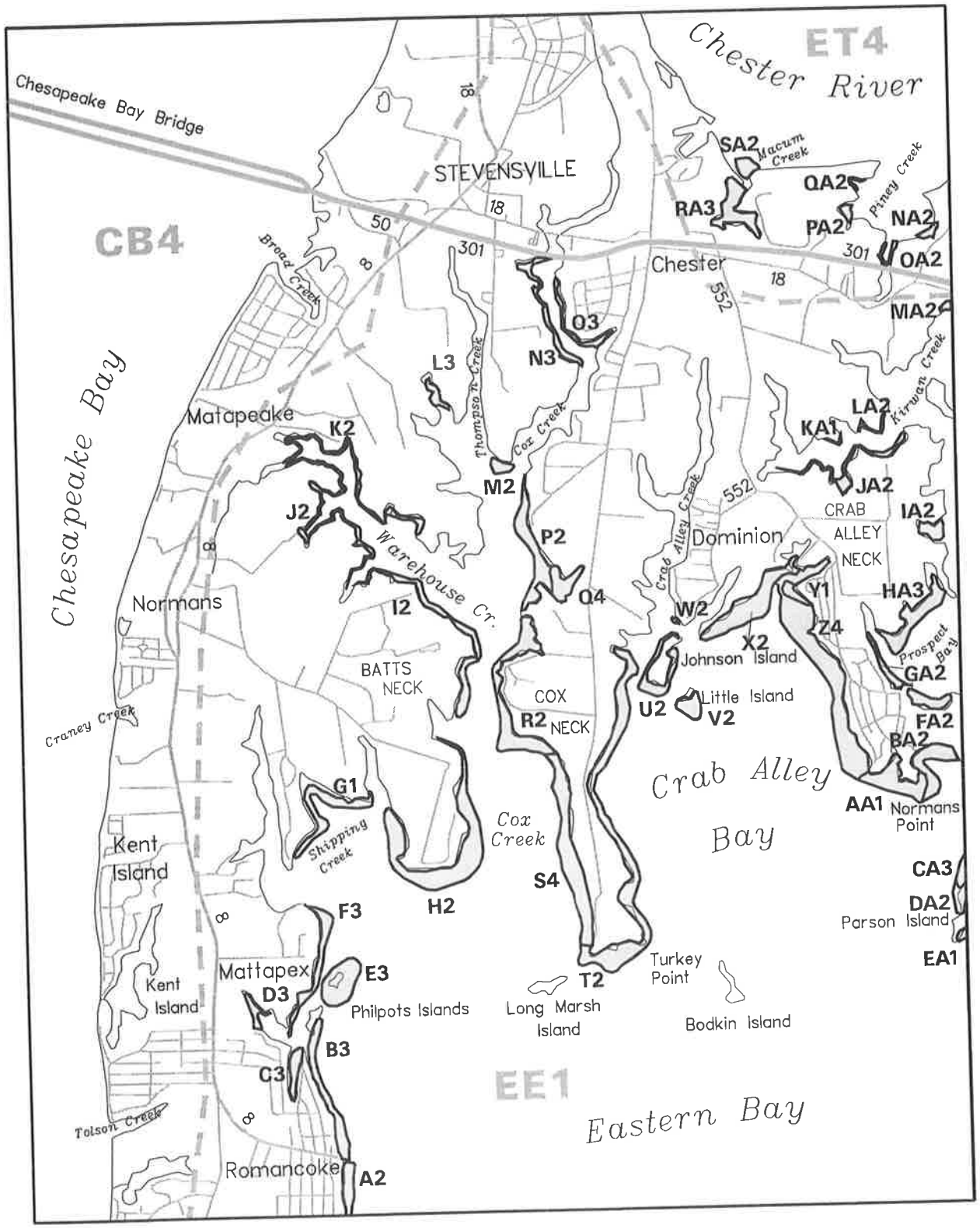
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/19/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Kent Island, Md. (032)



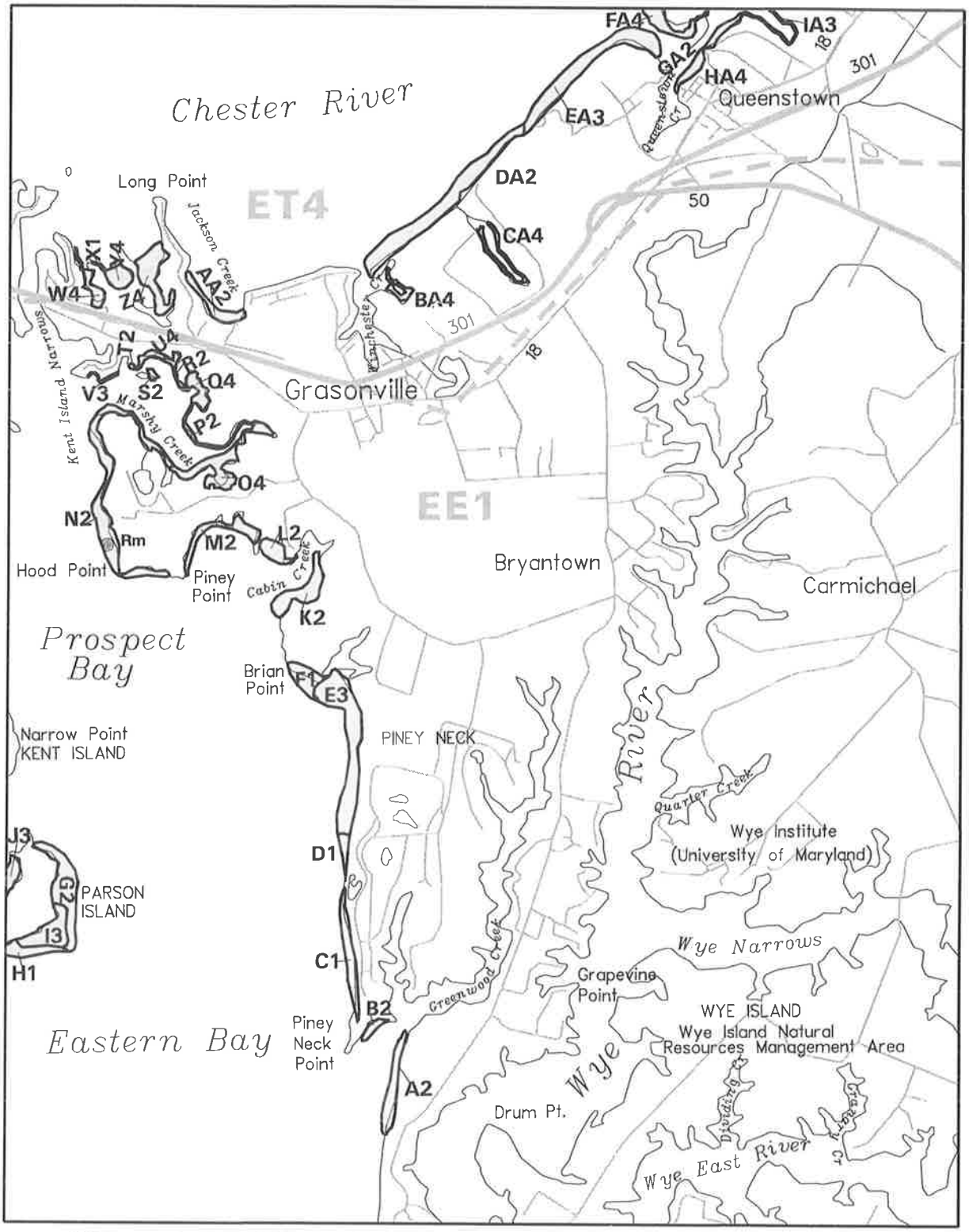
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/08/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(033) Queenstown, Md.

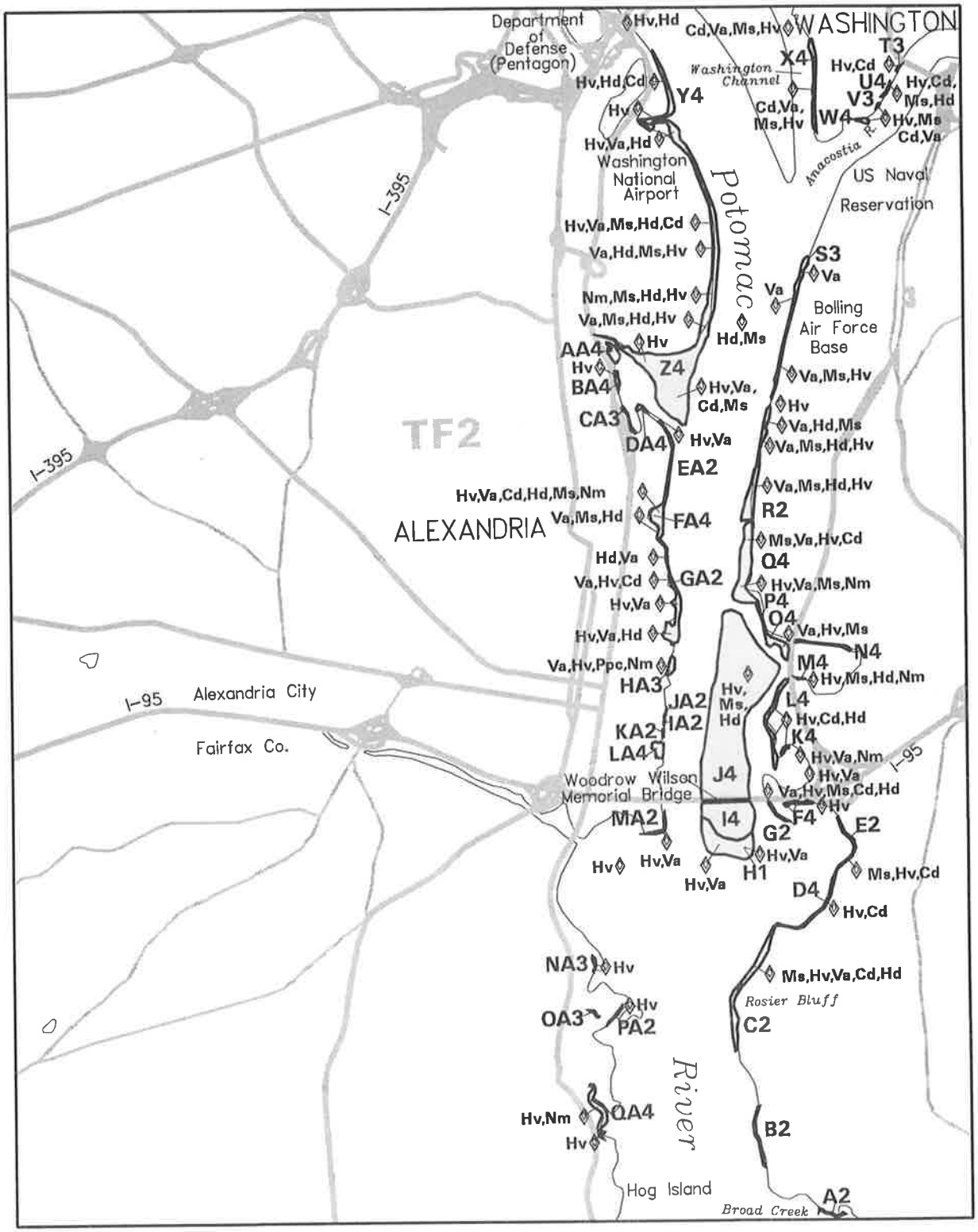


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/08/95, 07/19/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Alexandria, Va.–D.C.–Md. (034)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
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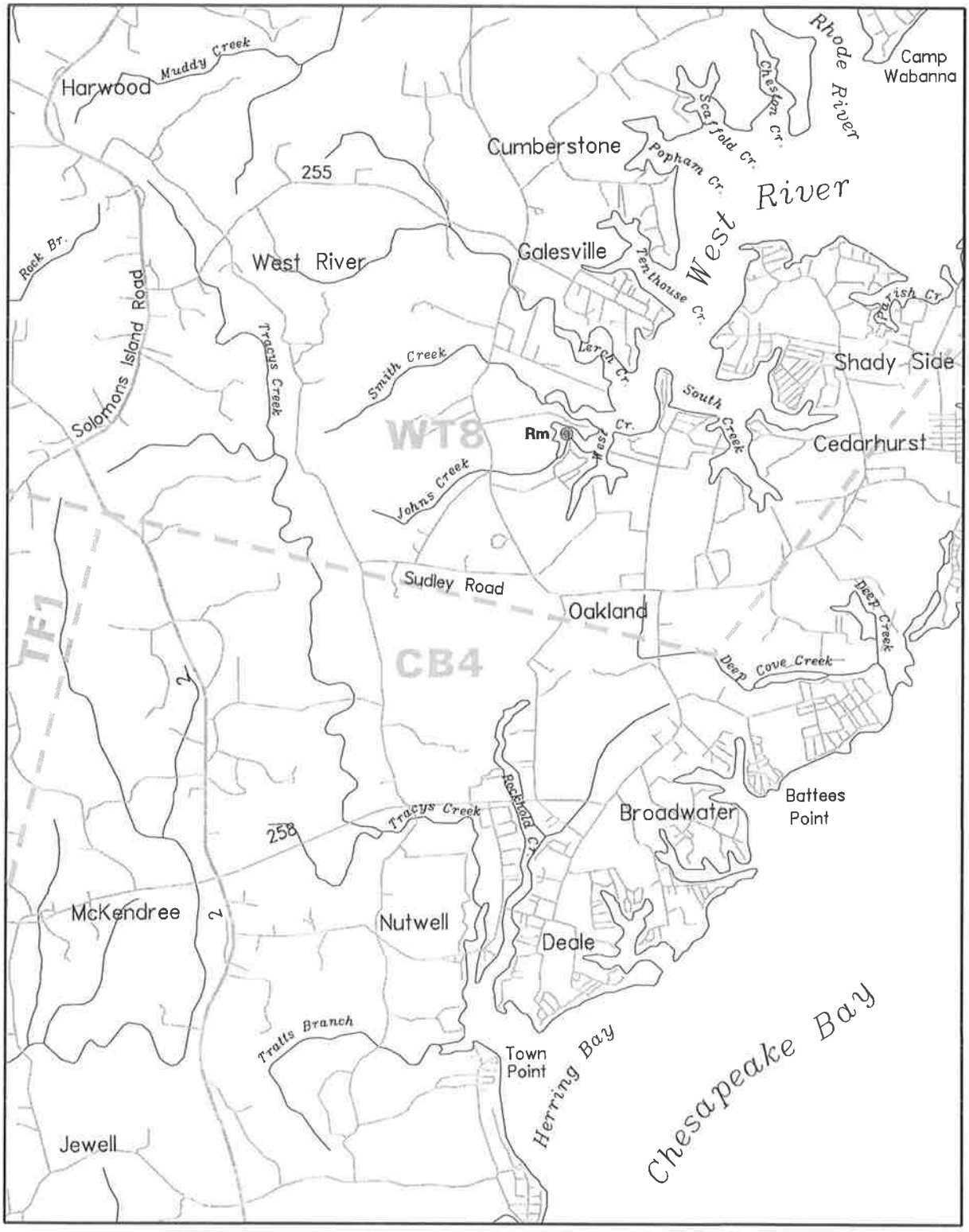
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(035) Deale, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 08/12/95

Produced by:
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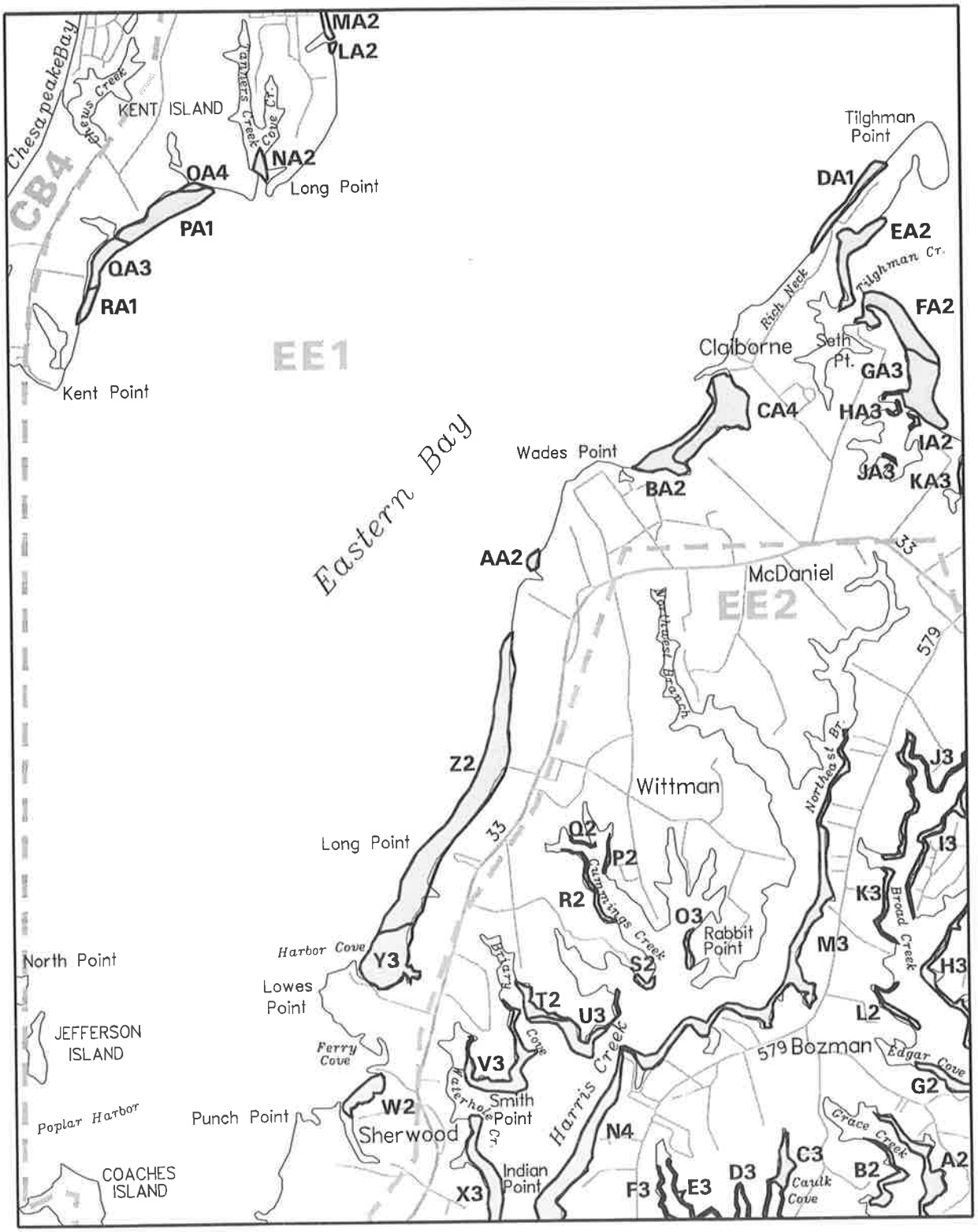
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Claiborne, Md. (036)



1000 0 1000 2000 meters

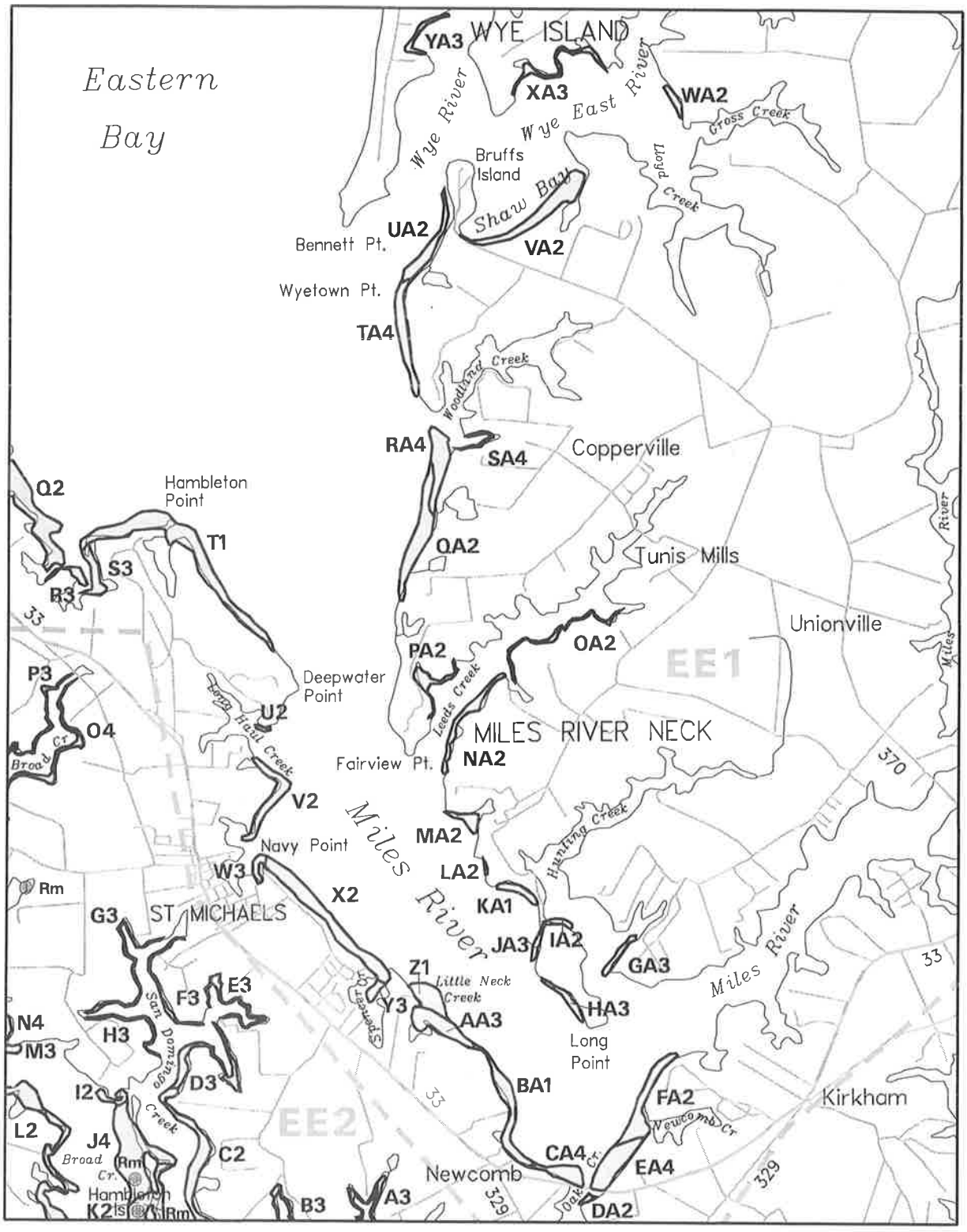
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/08/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(037) St. Michaels, Md.



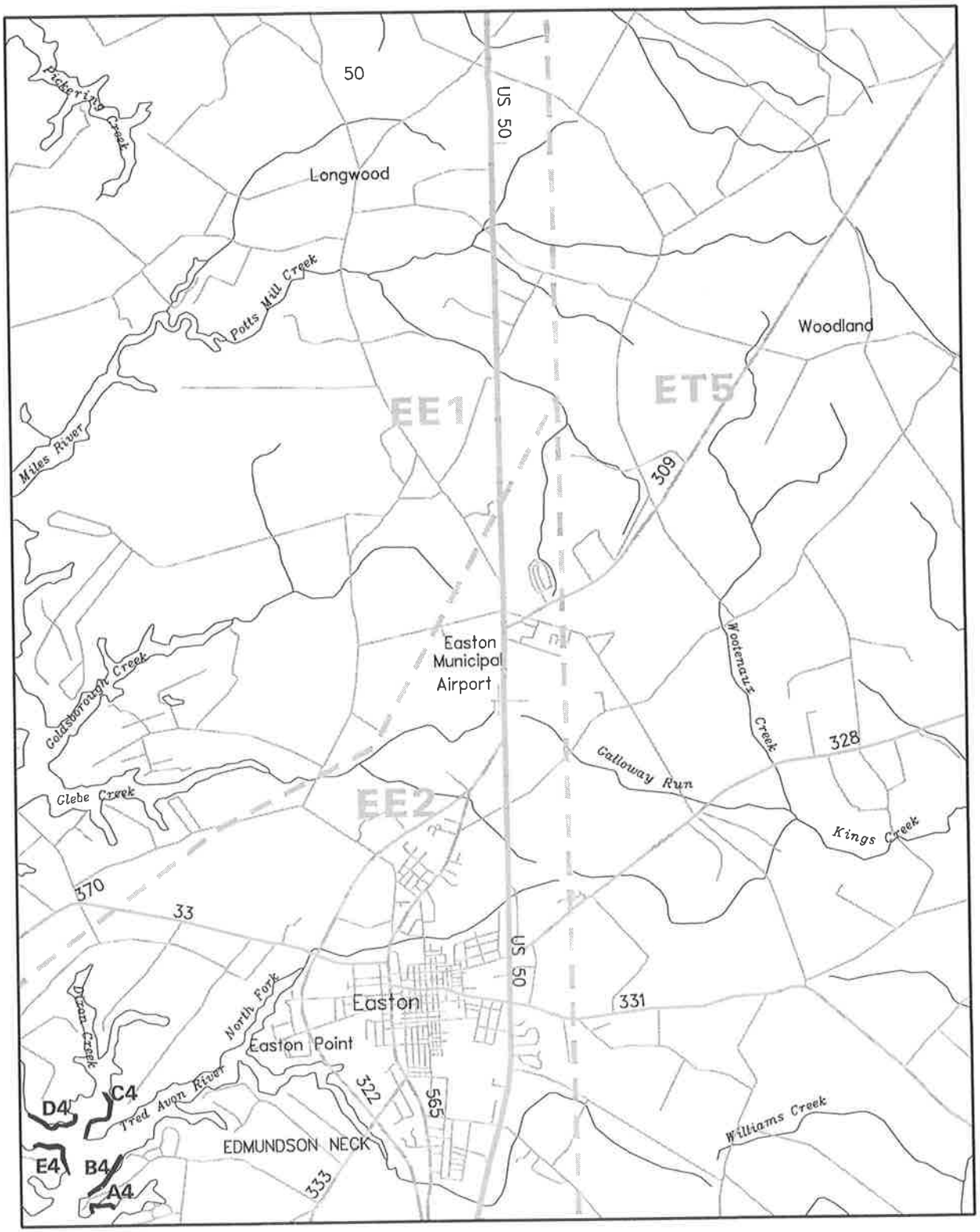
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/08/95, 07/11/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Easton, Md. (038)



1000 0 1000 2000 meters

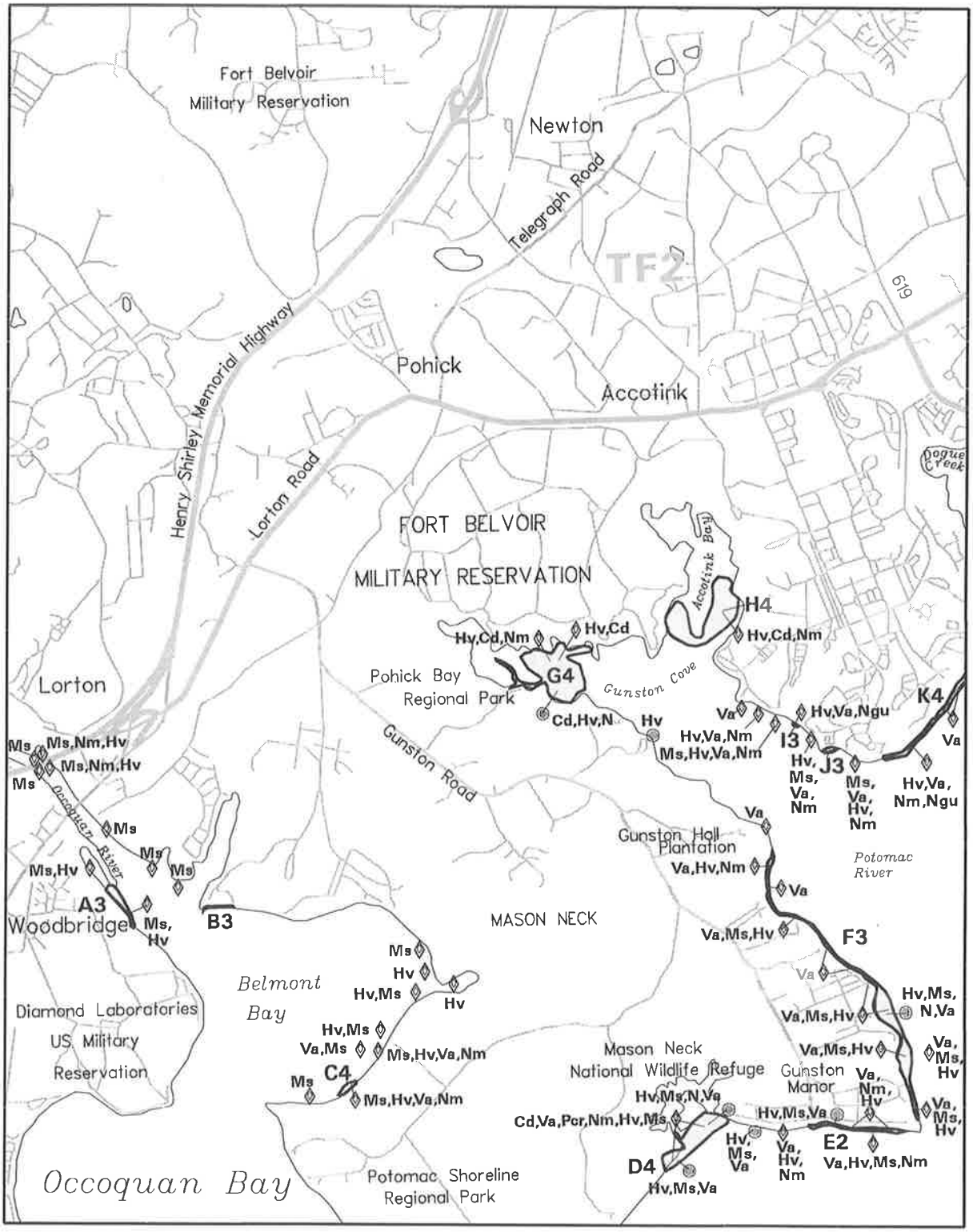
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/24/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(039) Fort Belvoir, Va.–Md.



1000 0 1000 2000 meters

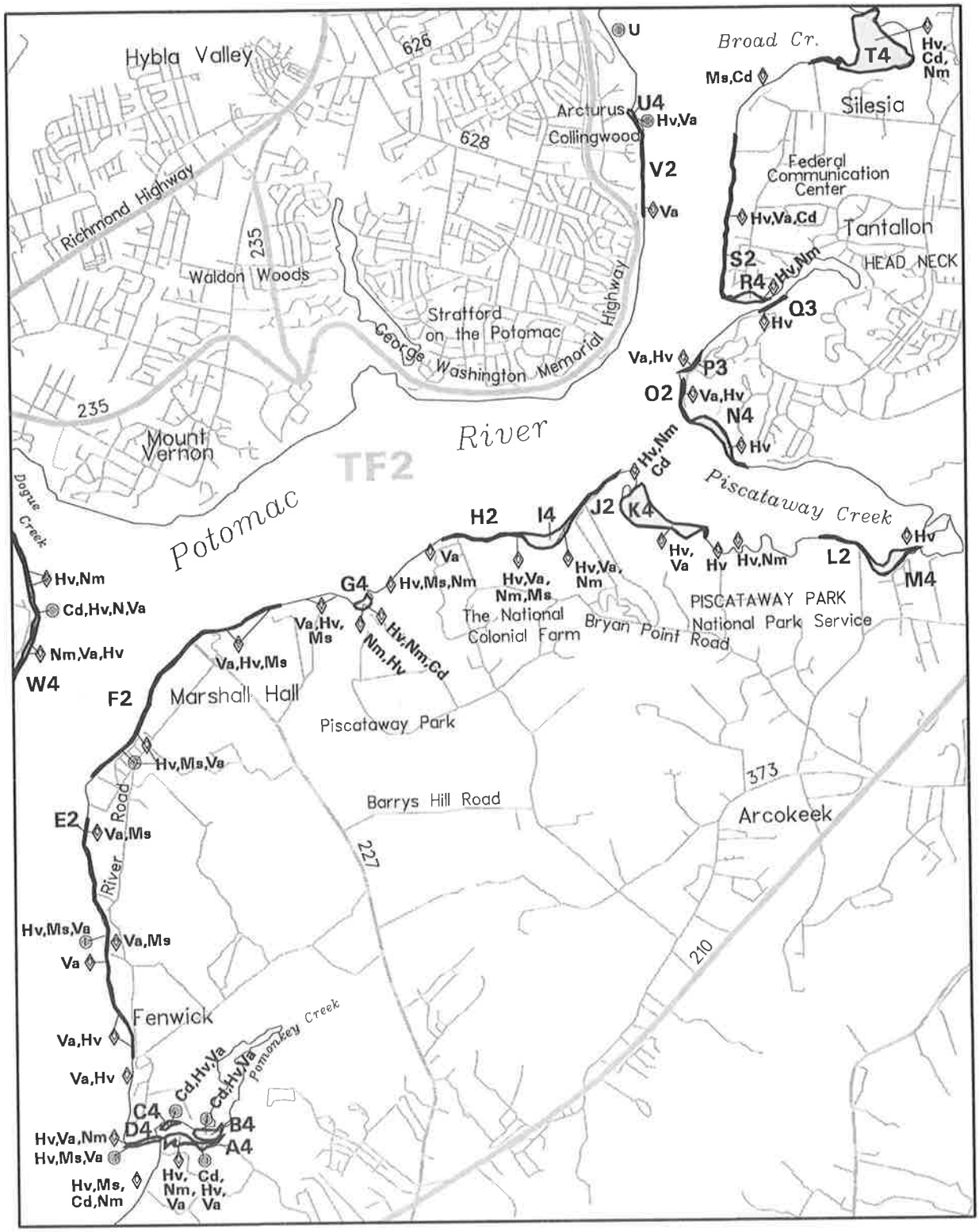
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Mt. Vernon, Md.–Va. (040)



1000 0 1000 2000 meters

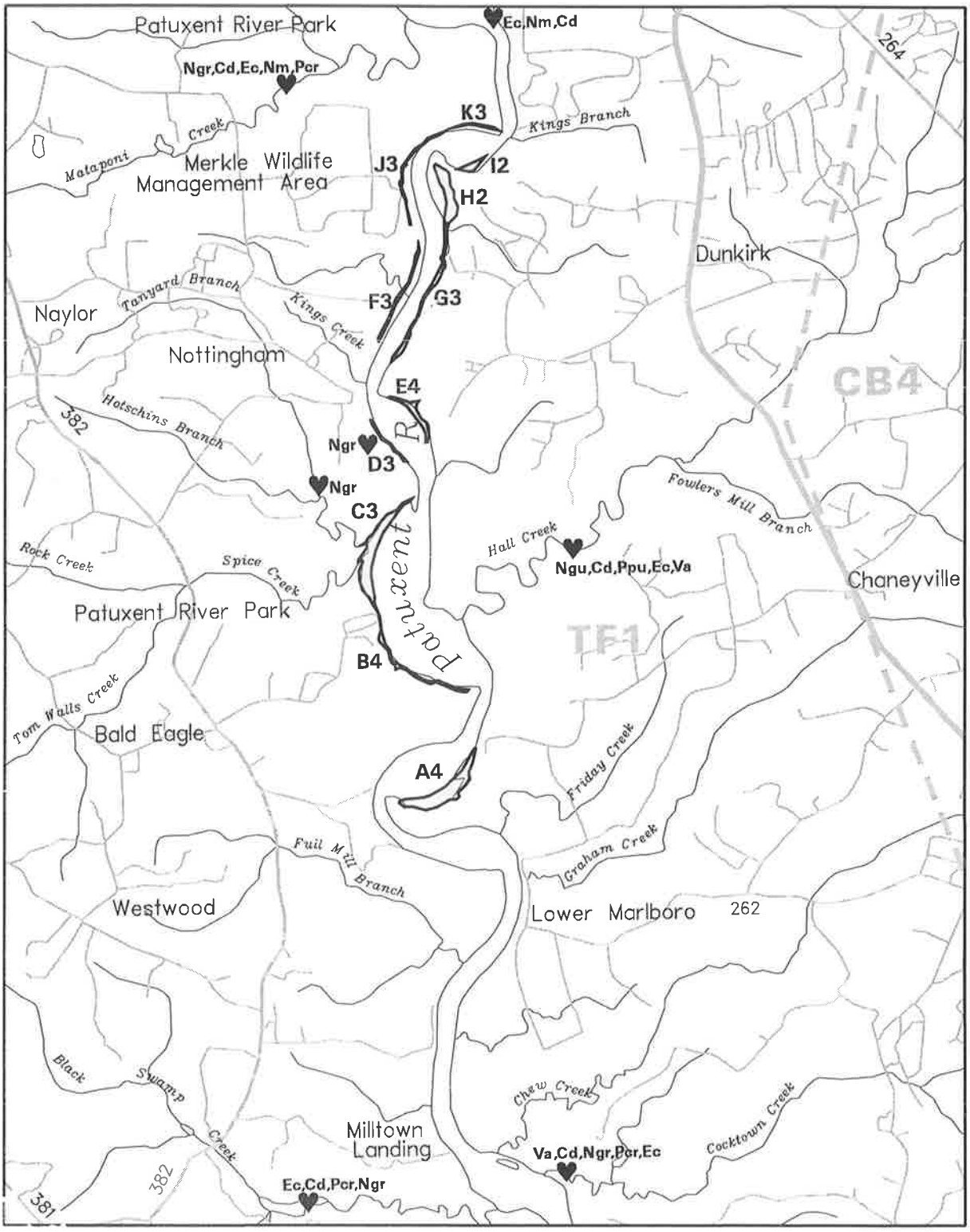
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(041) Lower Marlboro, Md.

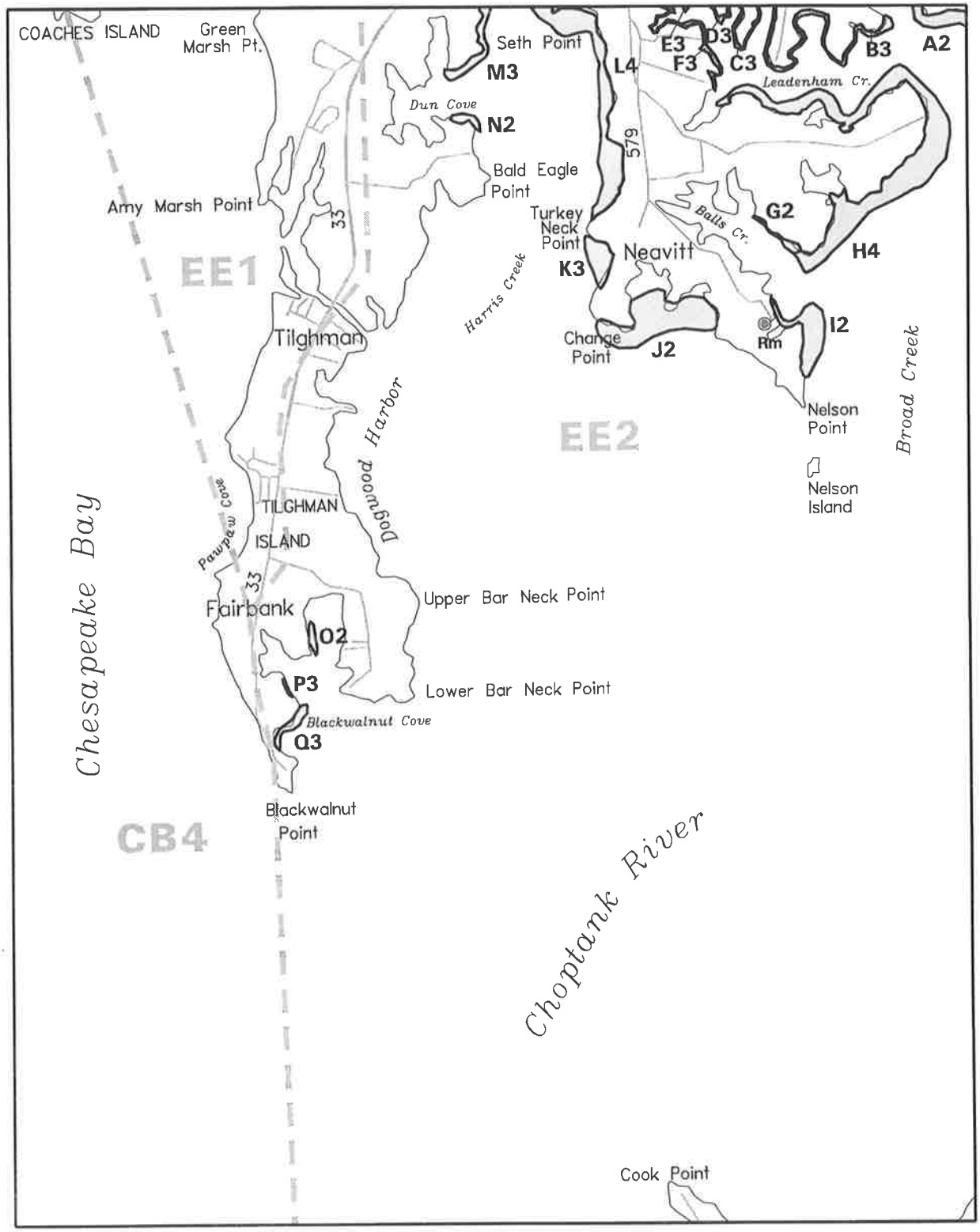


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Tilghman, Md. (043)

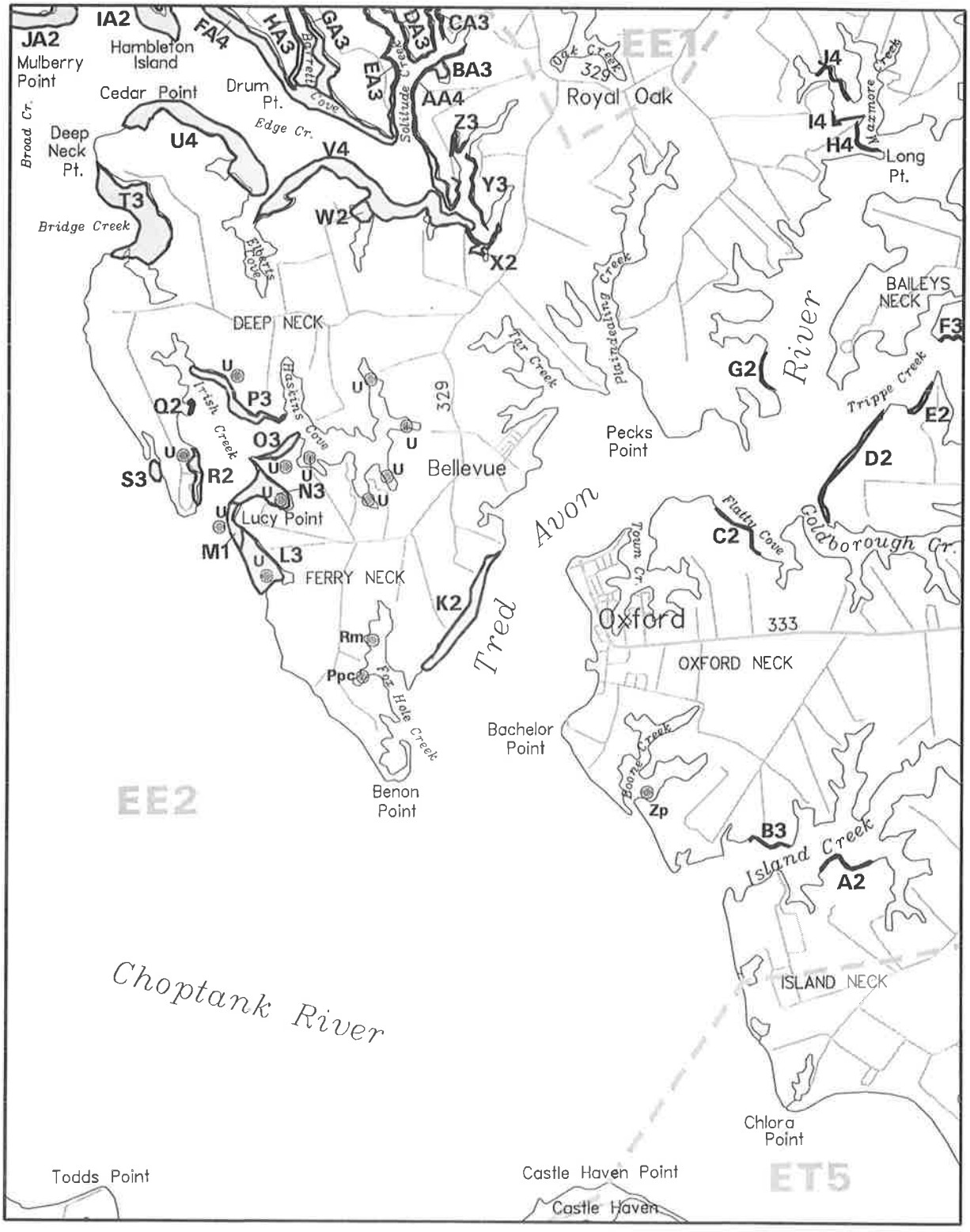


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/08/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(044) Oxford, Md.

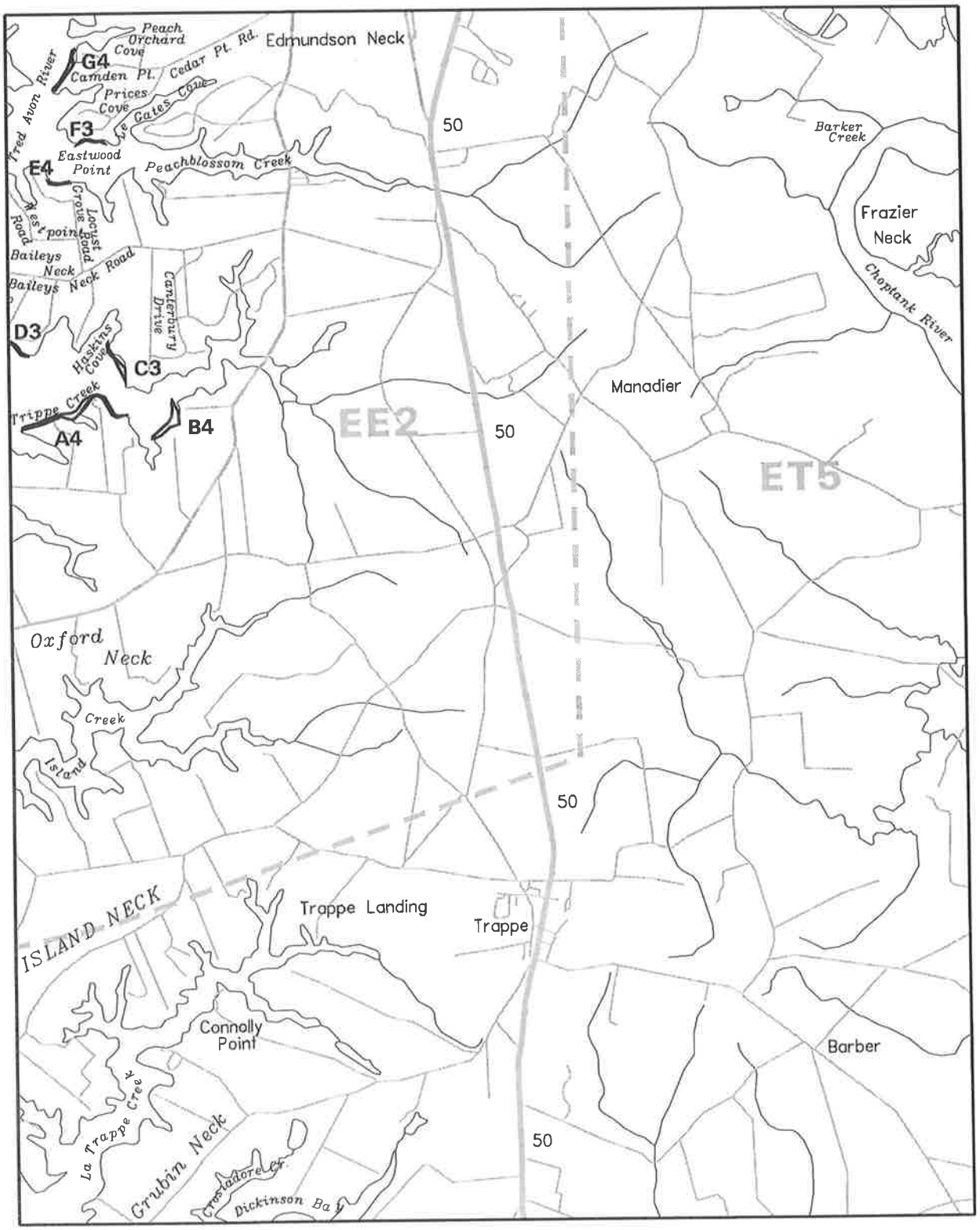


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/08/95, 07/11/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Trappe, Md. (045)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/24/95

Produced by:
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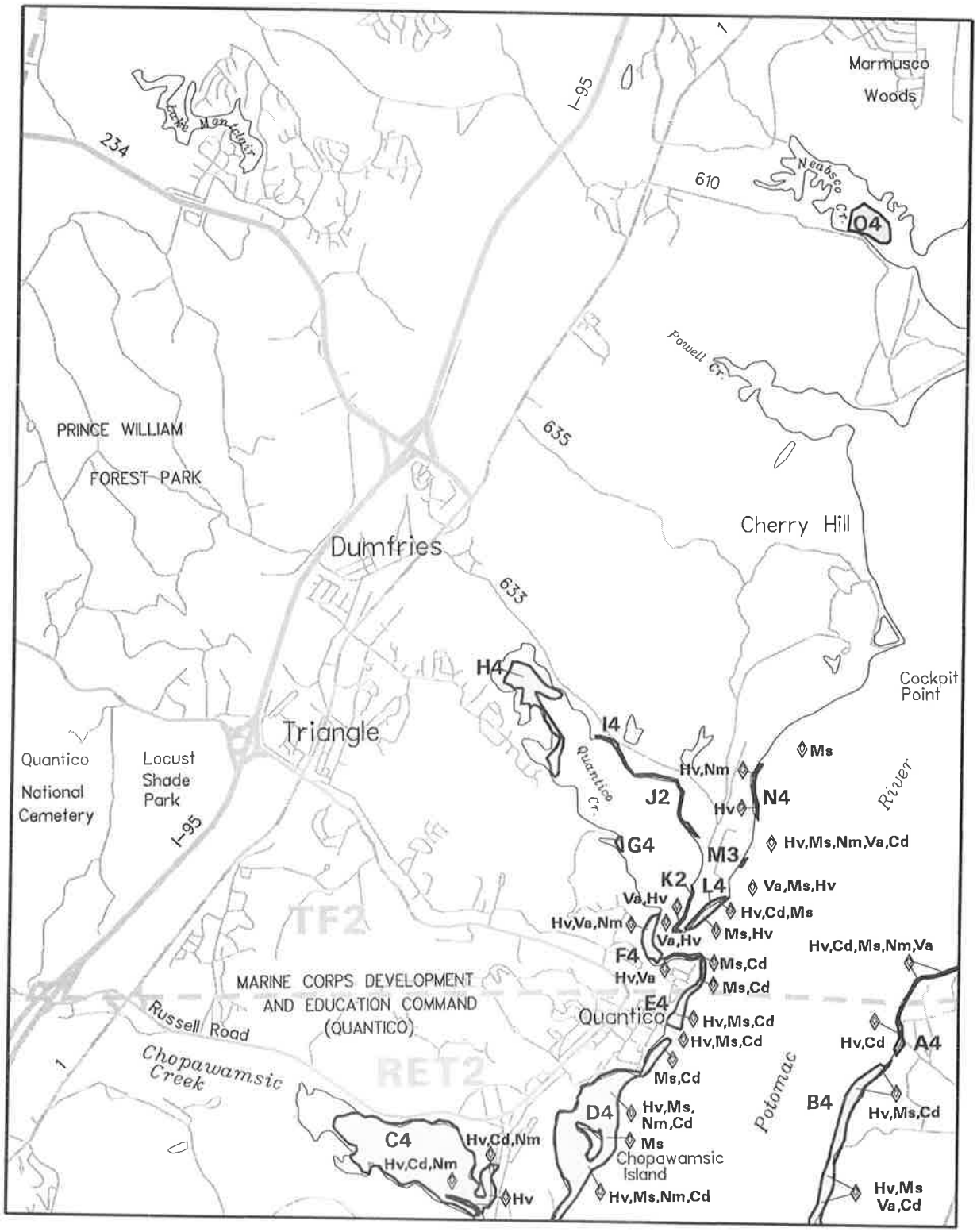
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(047) Quantico, Va.–Md.



1000 0 1000 2000 meters

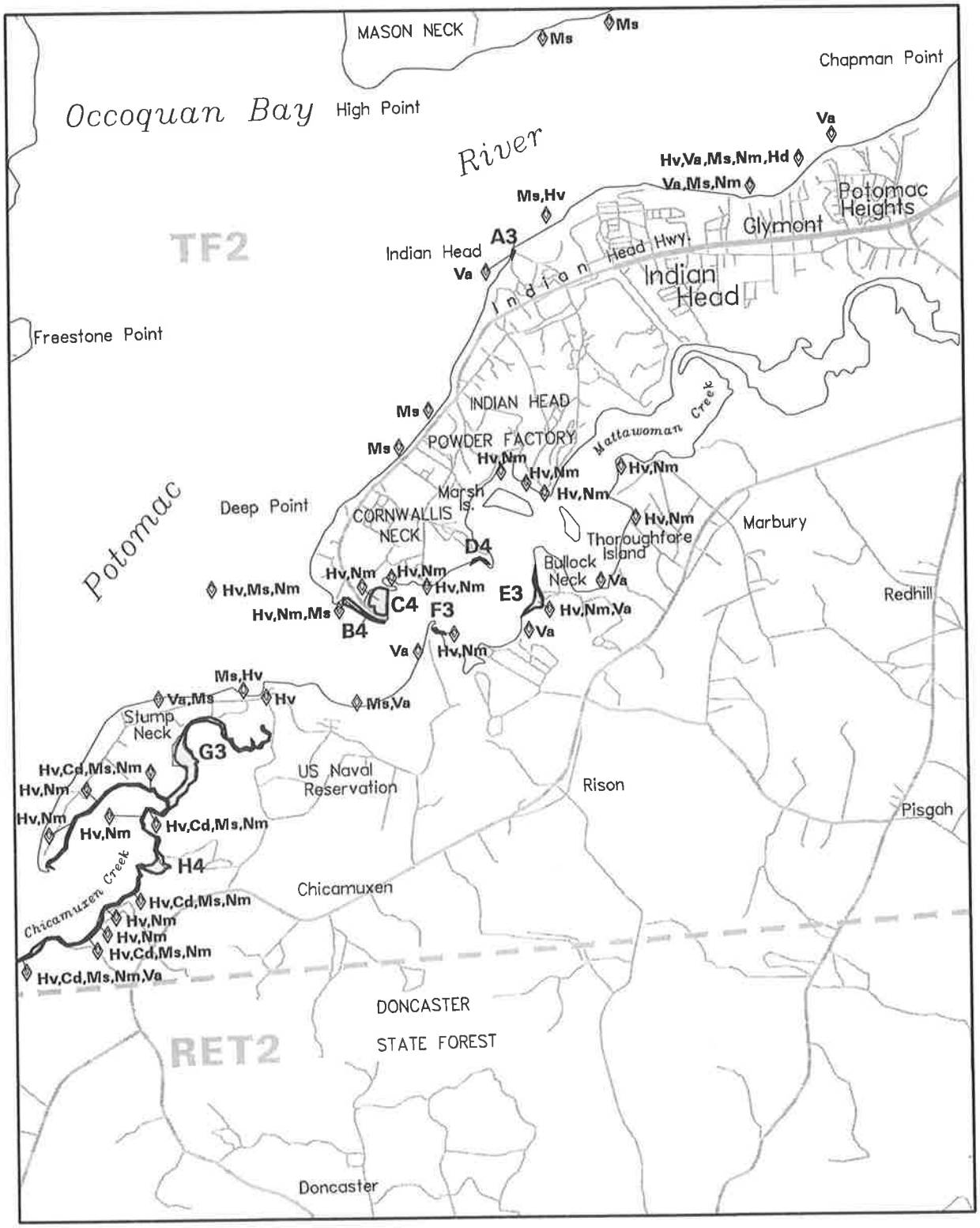
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Indian Head, Va.–Md. (048)



1000 0 1000 2000 meters

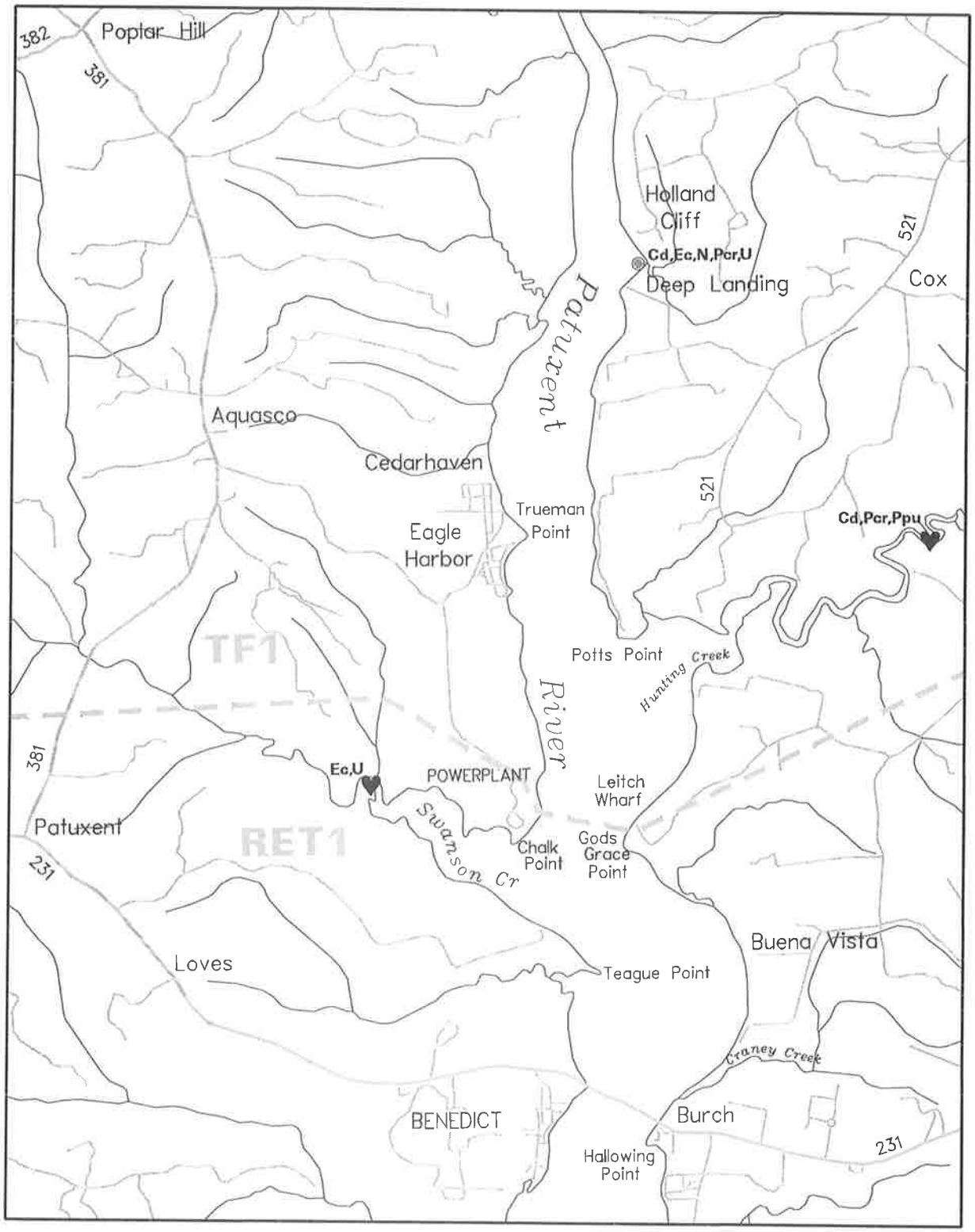
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(049) Benedict, Md.



1000 0 1000 2000 meters

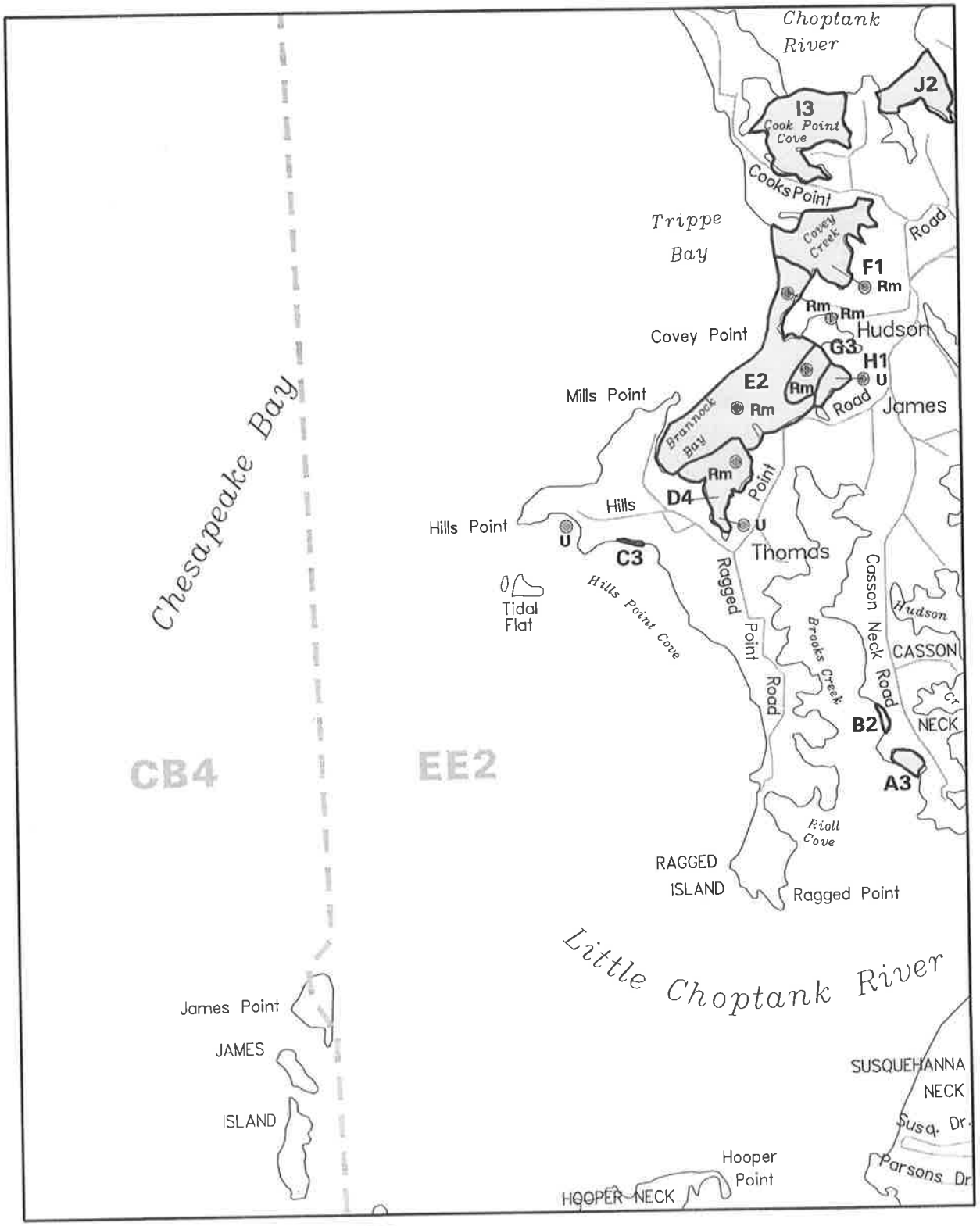
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Hudson, Md. (051)



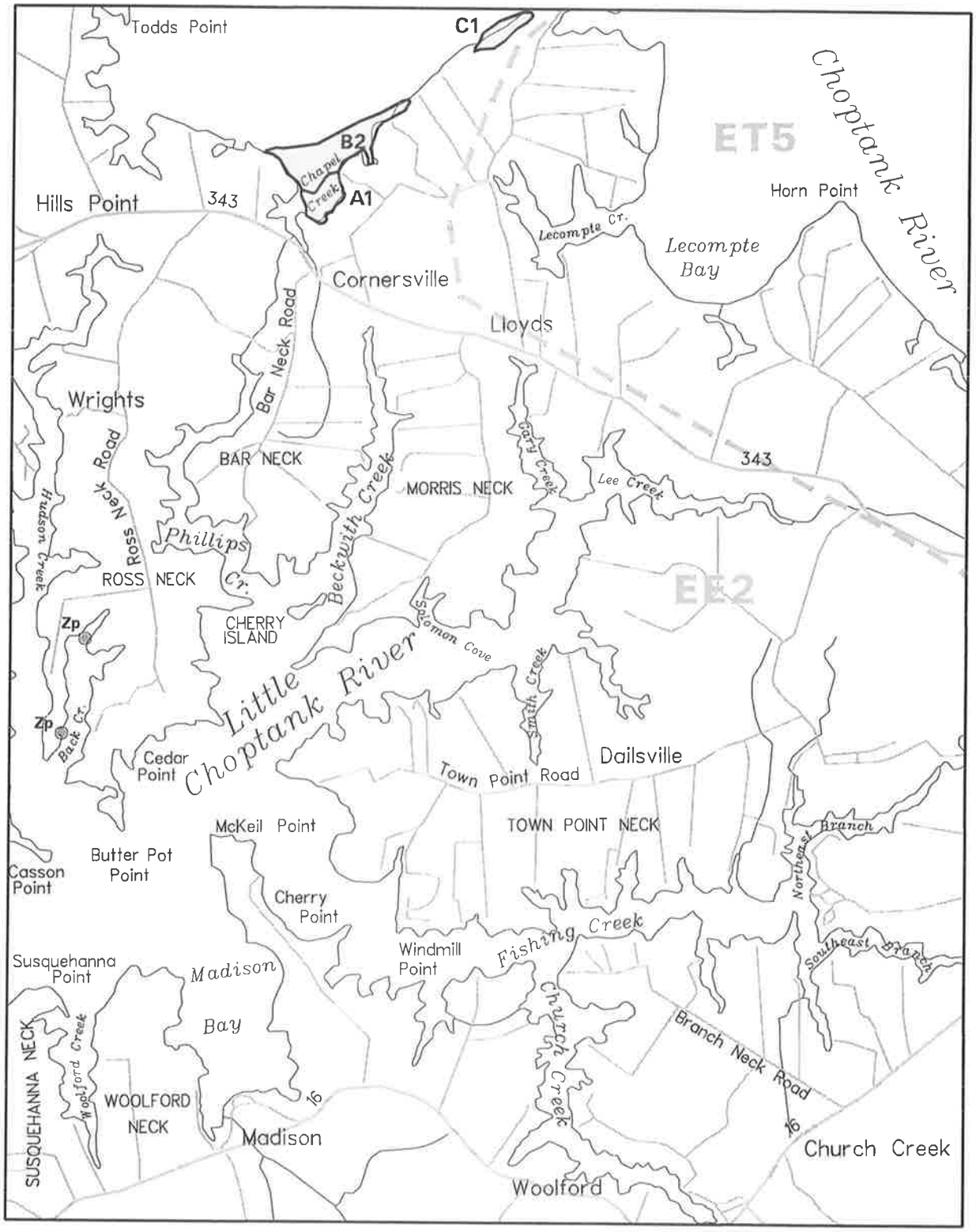
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/11/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(052) Church Creek, Md.

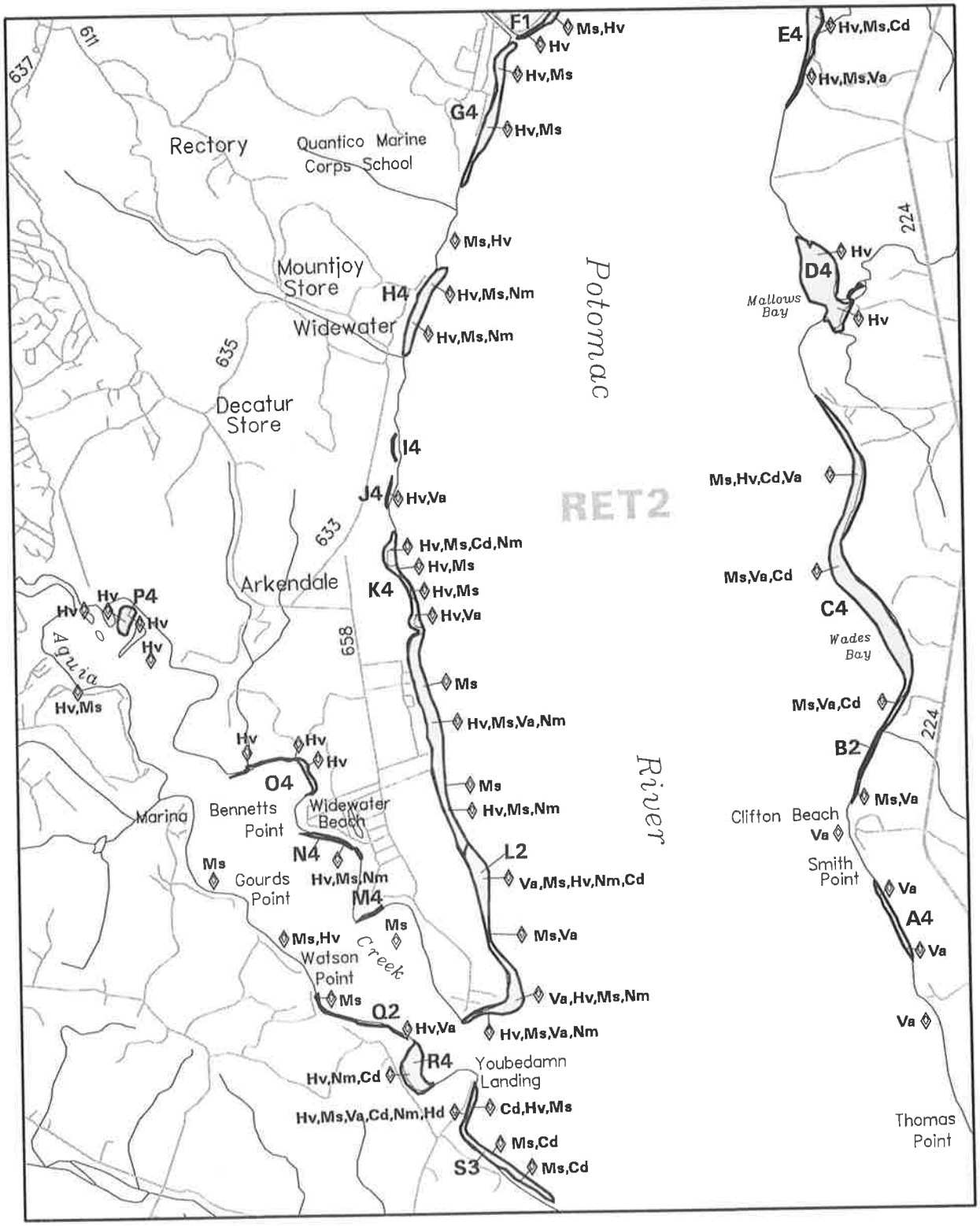


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/11/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Widewater, Va.–Md. (055)



1000 0 1000 2000 meters

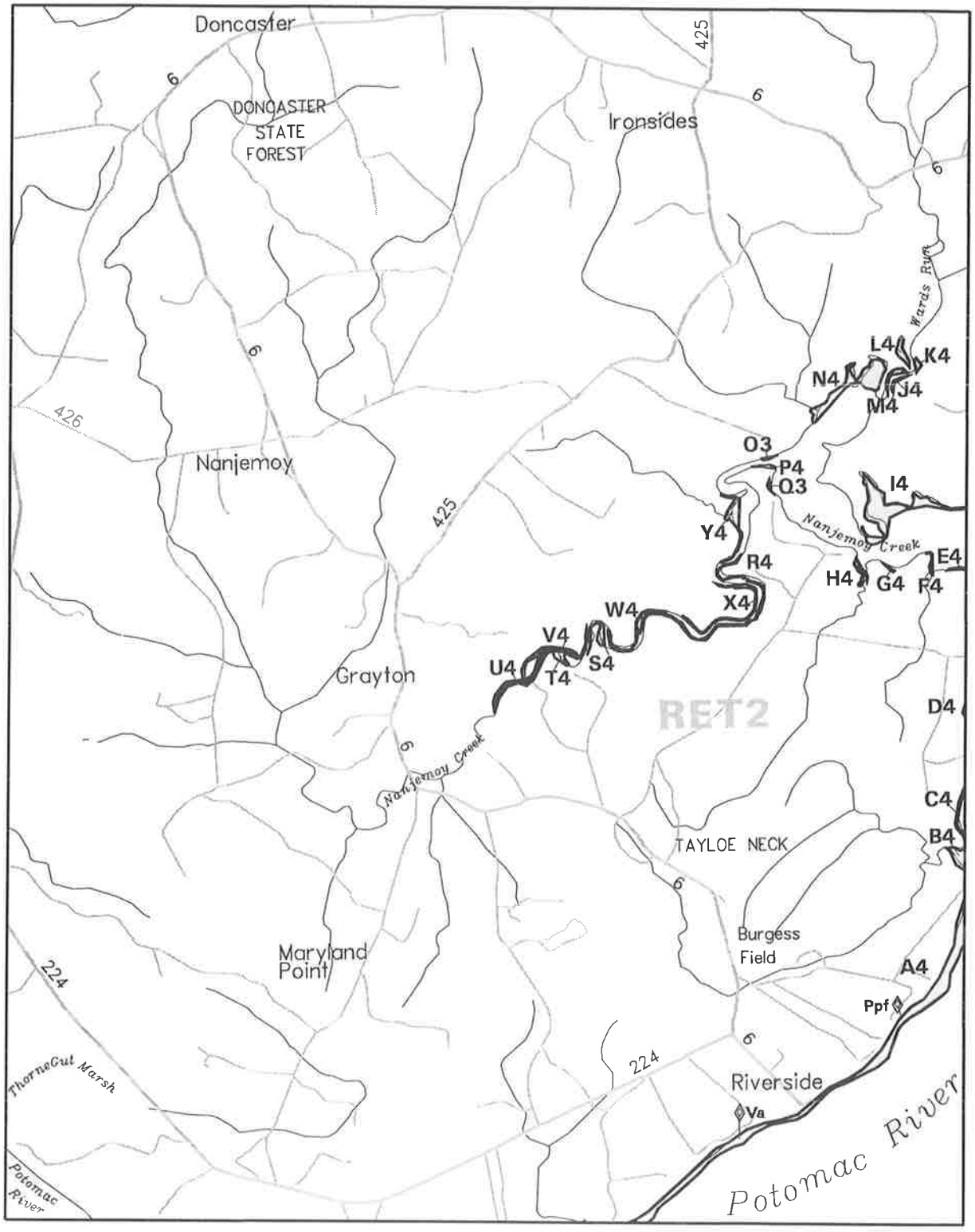
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(056) Nanjemoy, Md.



1000 0 1000 2000 meters

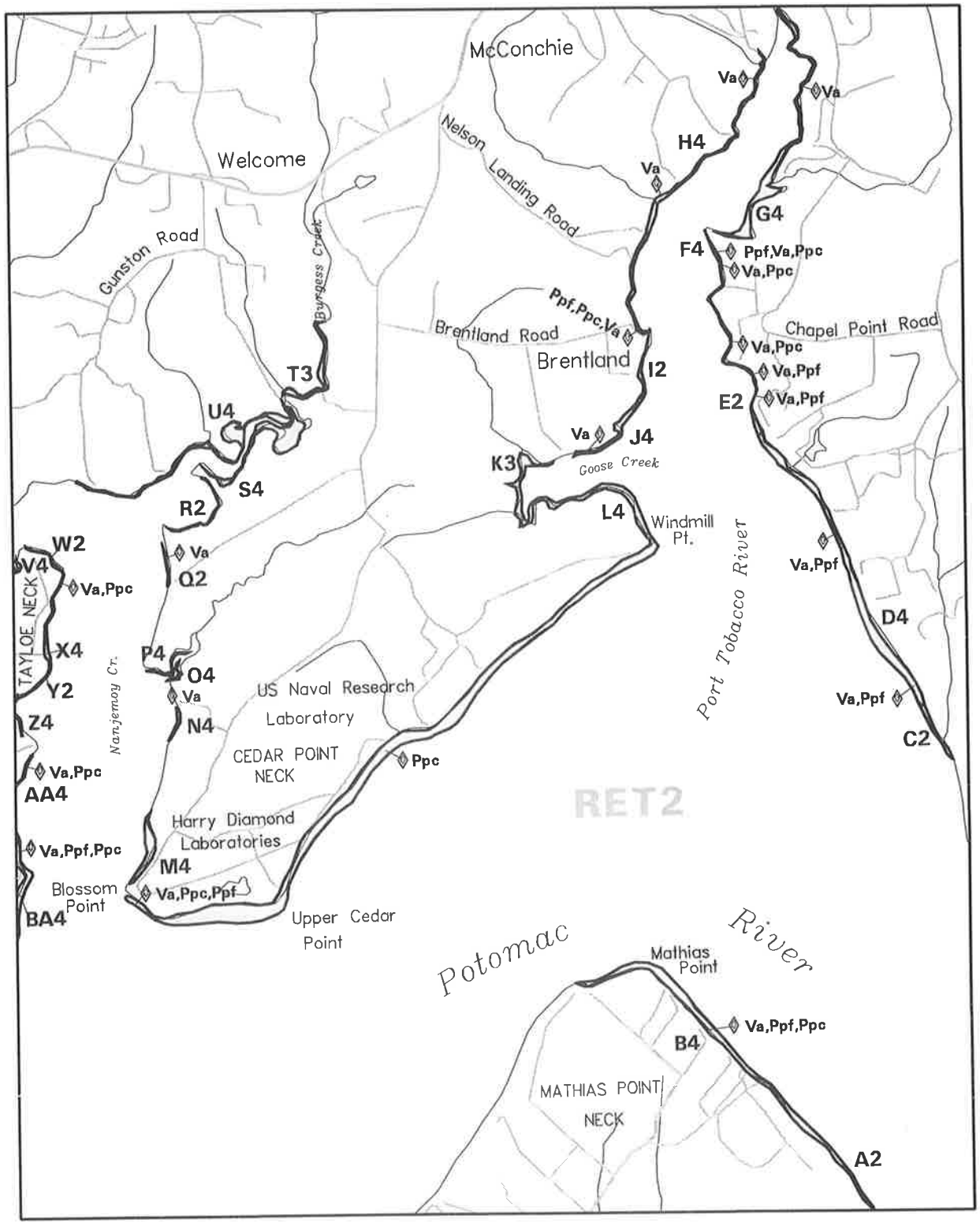
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/20/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Mathias Point, Md.– Va. (057)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
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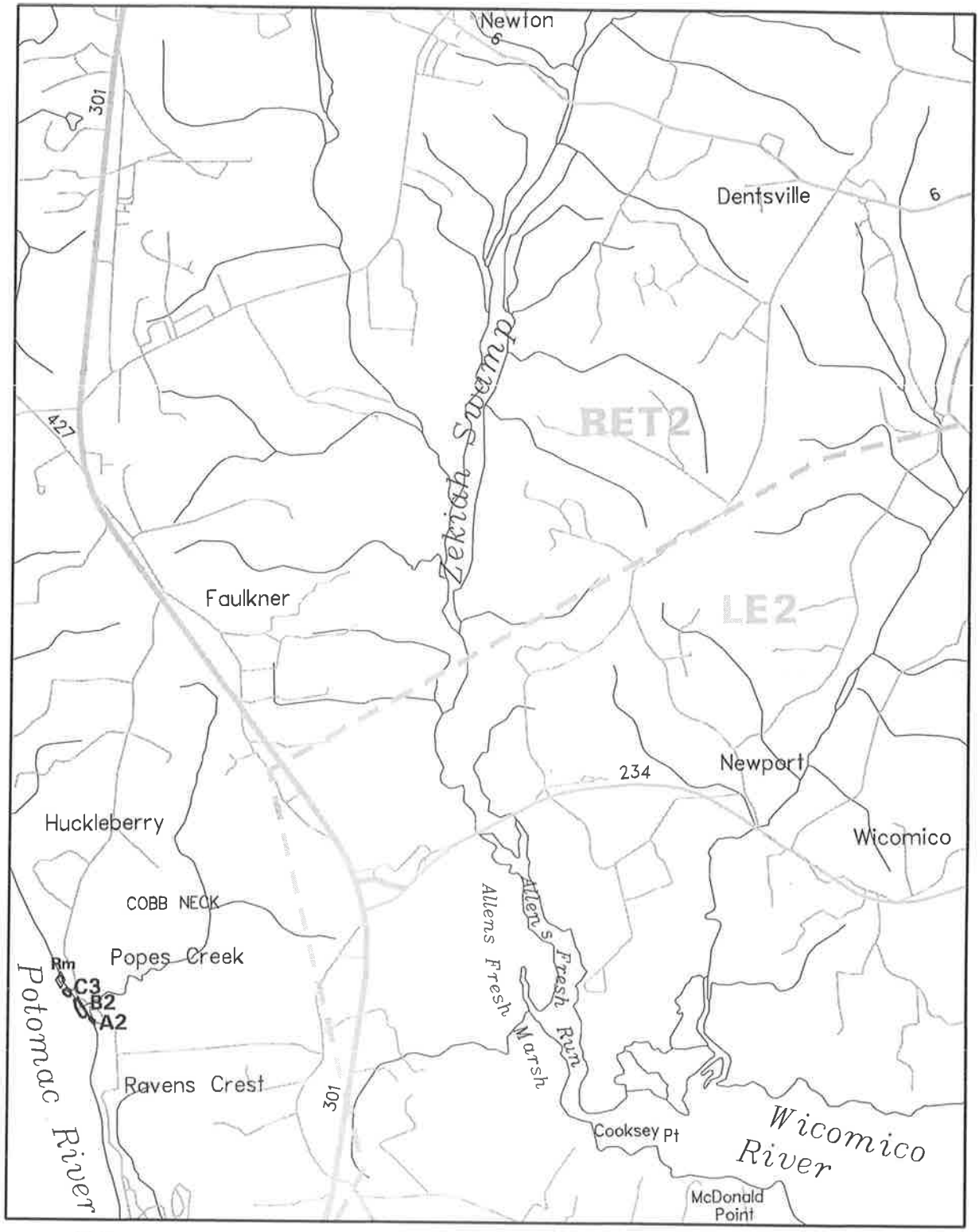
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(058) Popes Creek, Md.



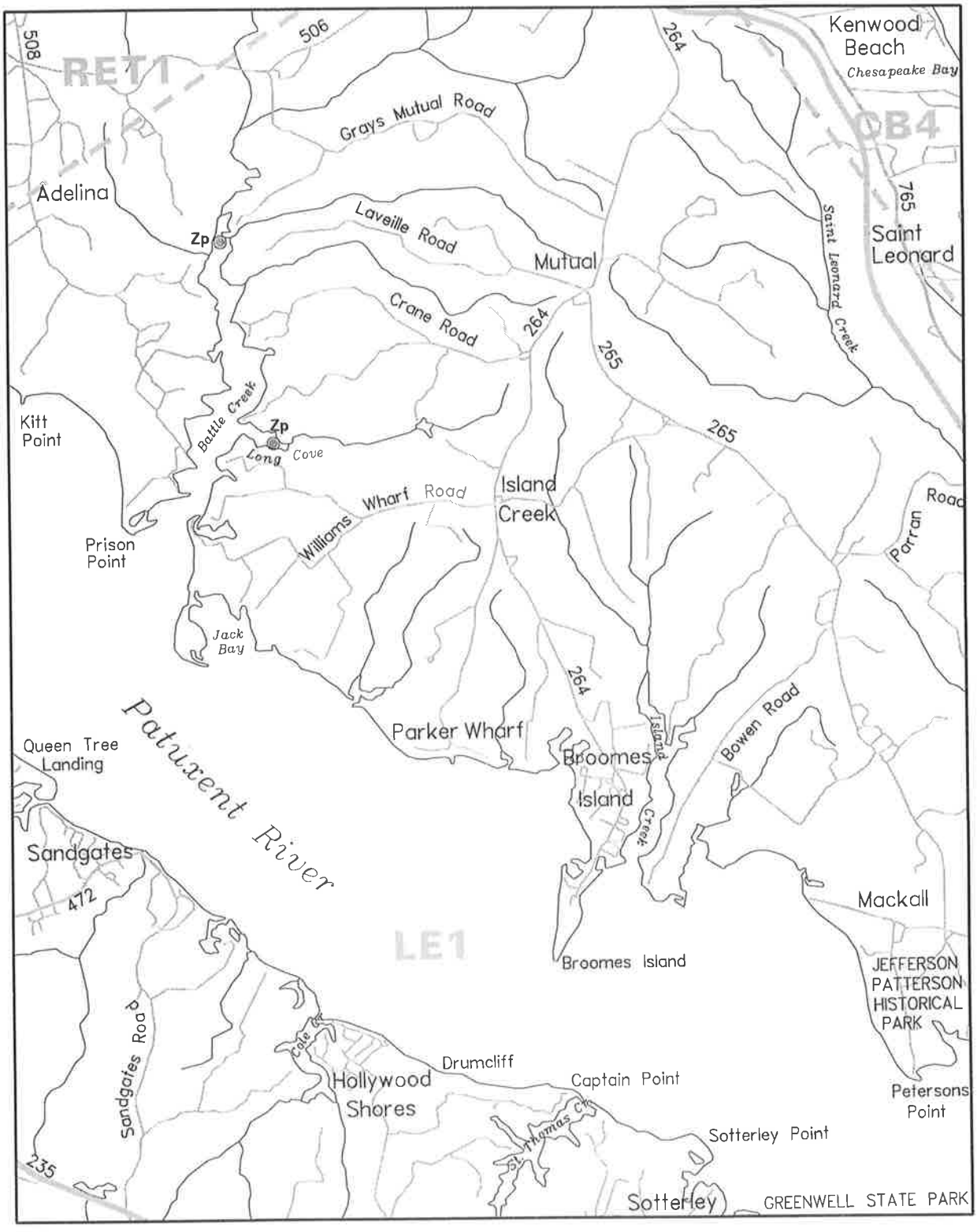
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Broomes Island, Md. (060)



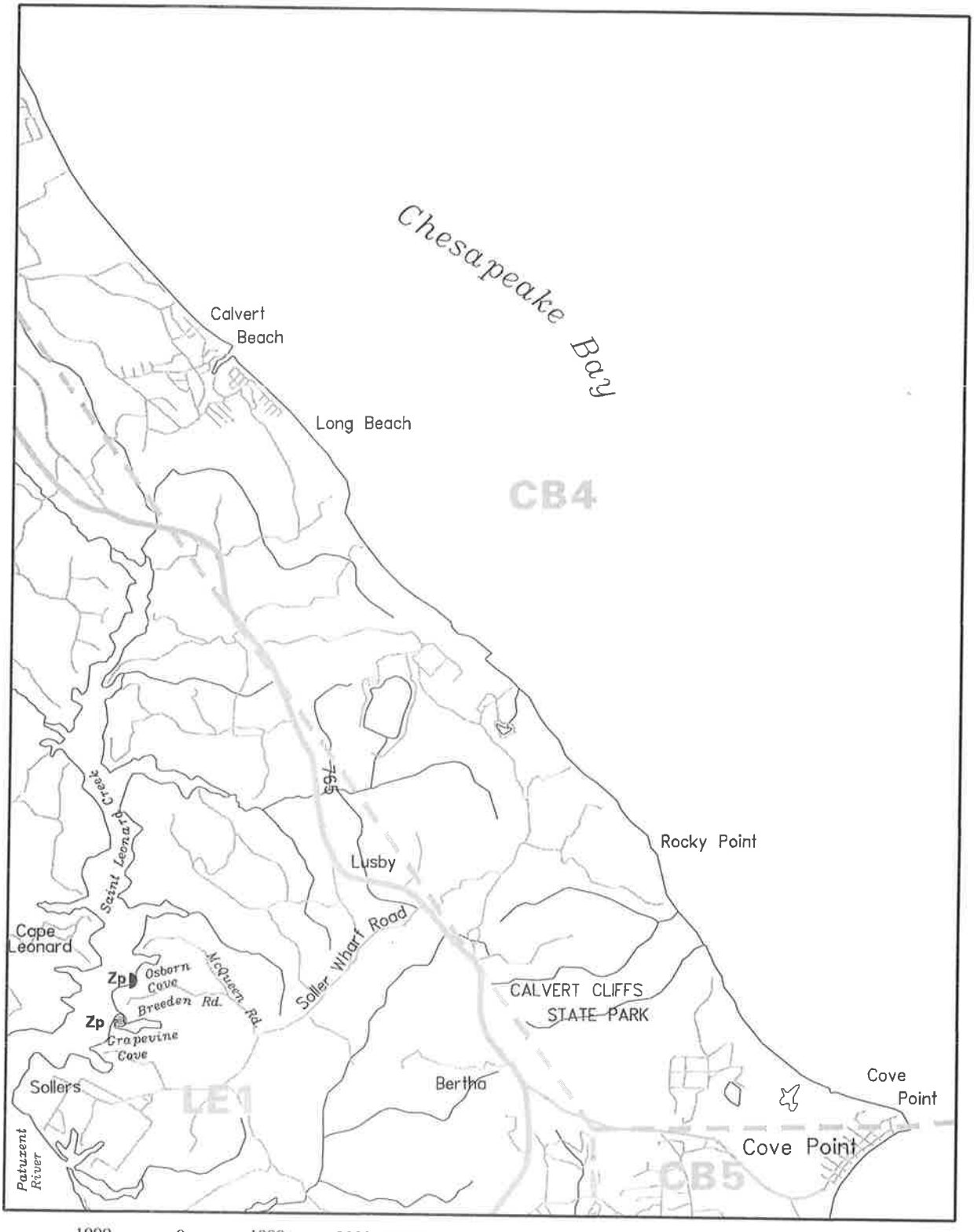
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(061) Cove Point, Md.

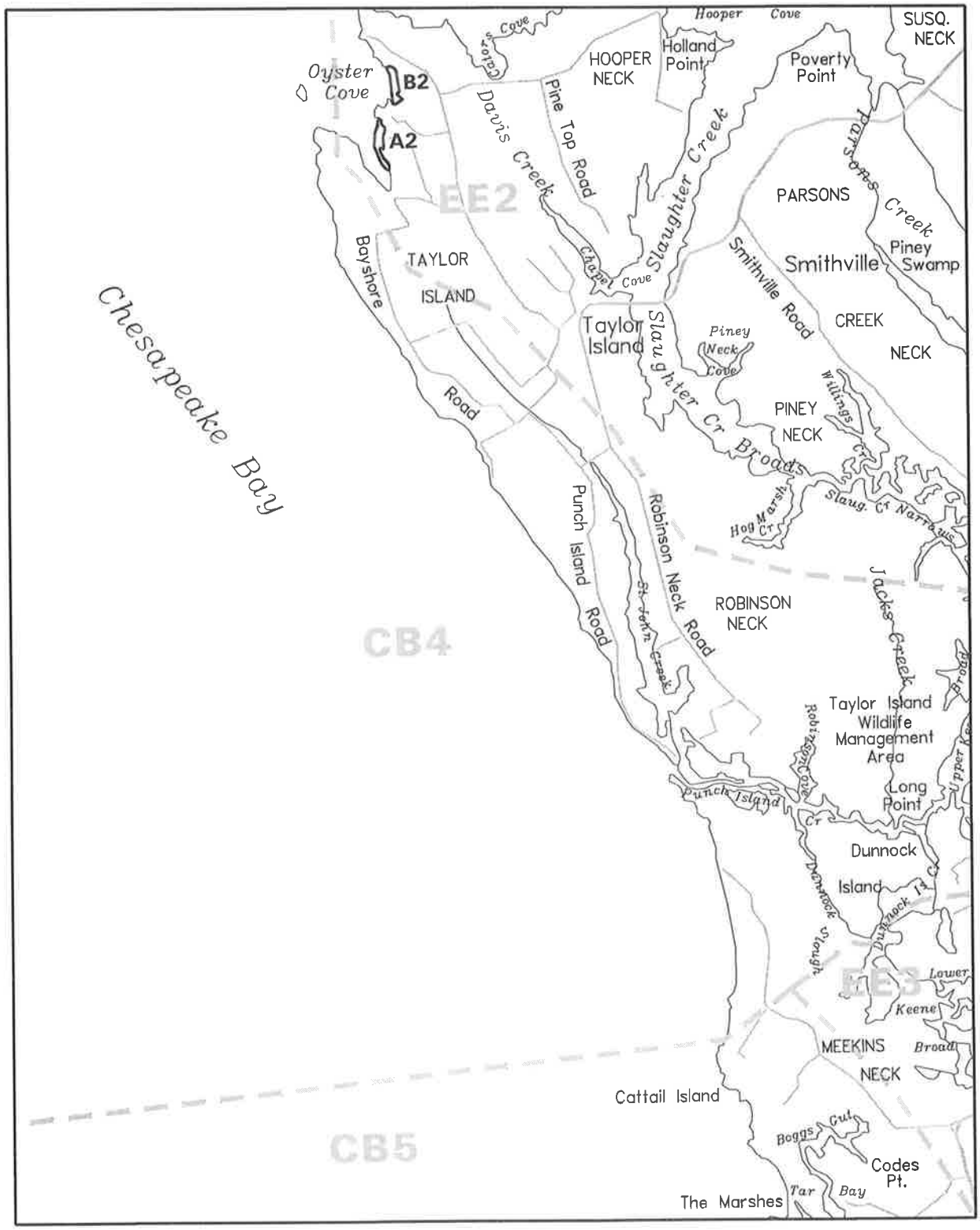


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/30/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Taylors Island, Md. (062)



1000 0 1000 2000 meters

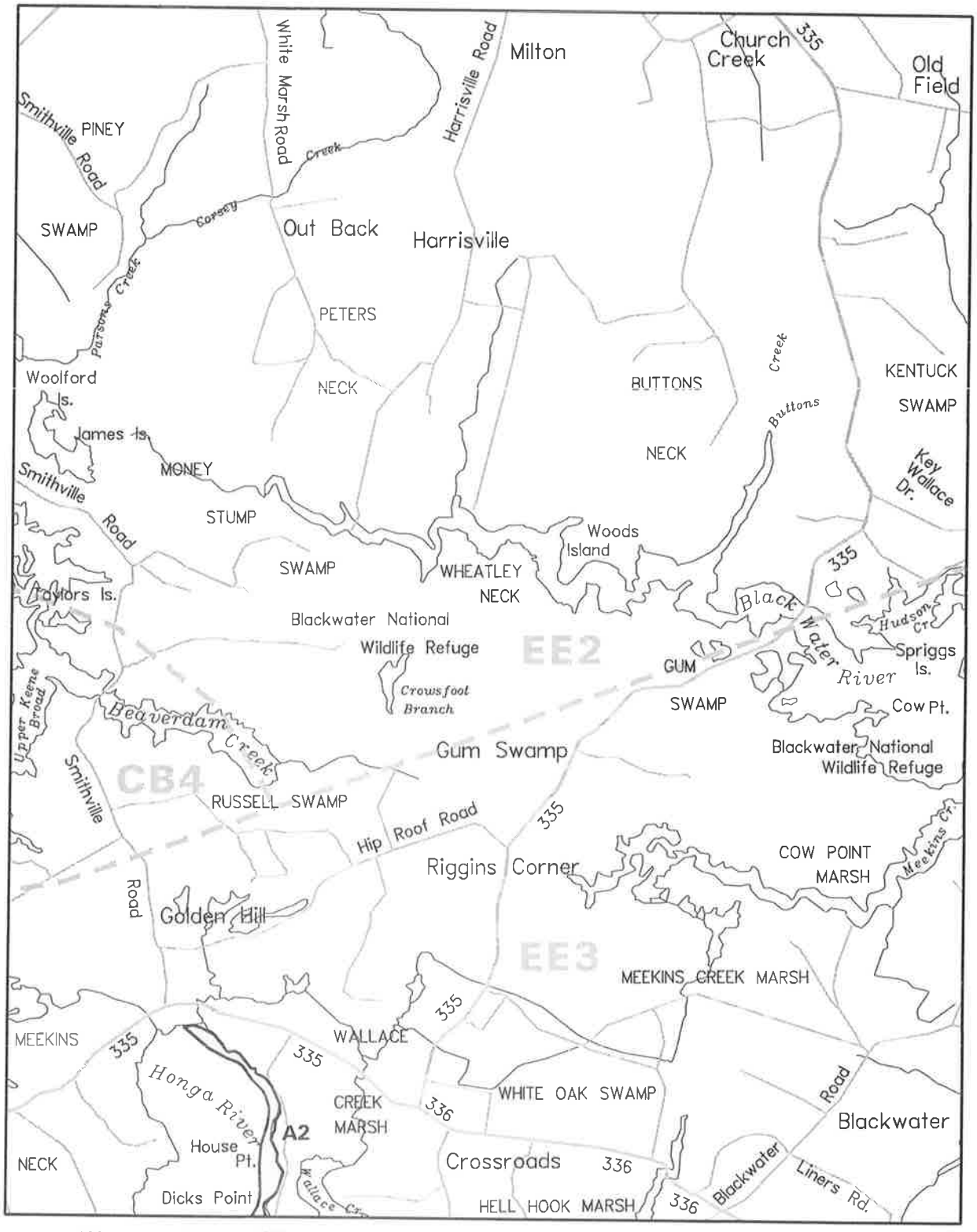
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95, 07/24/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(063) Golden Hill, Md.

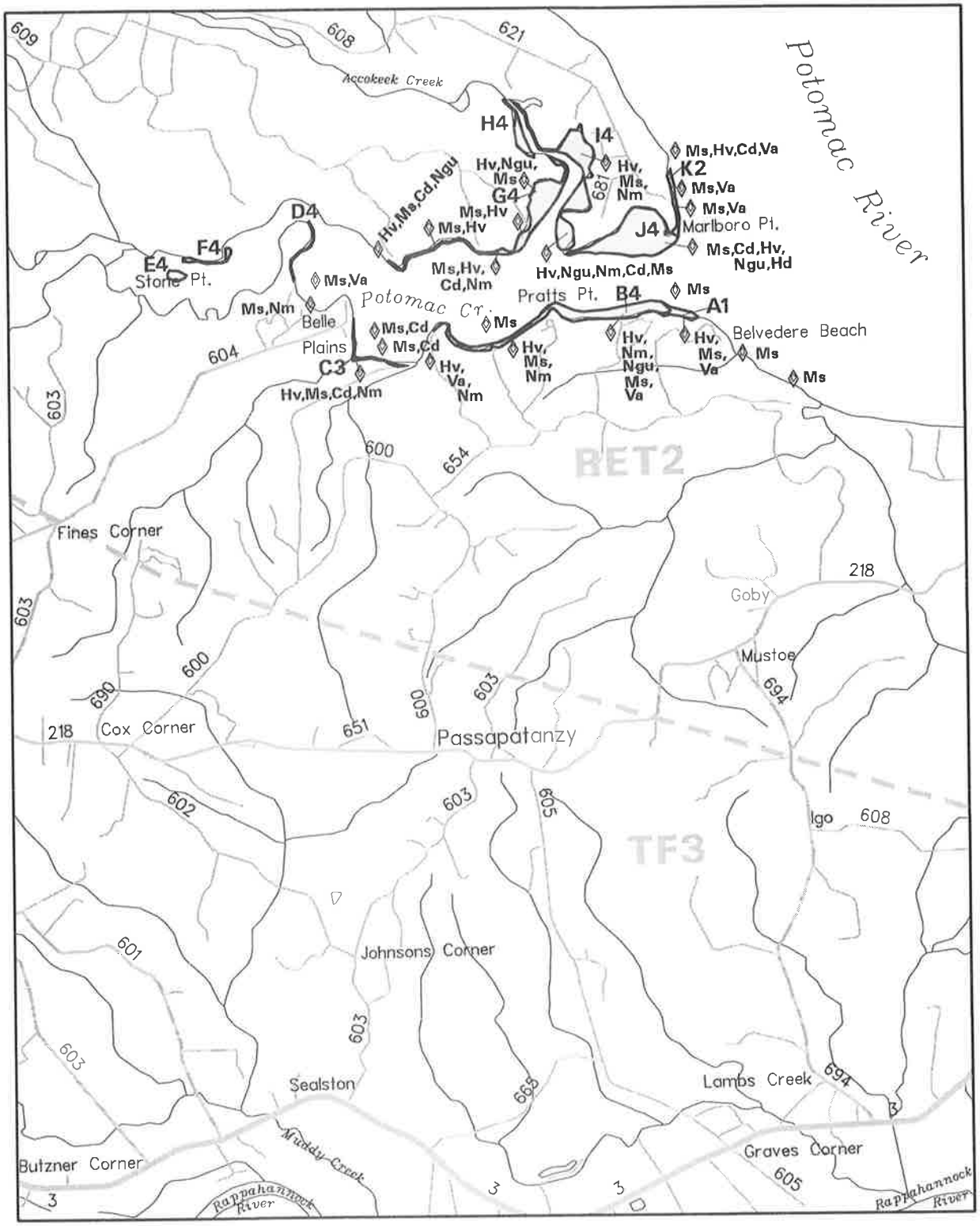


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Passapatanzy, Md.–Va. (064)



1000 0 1000 2000 meters

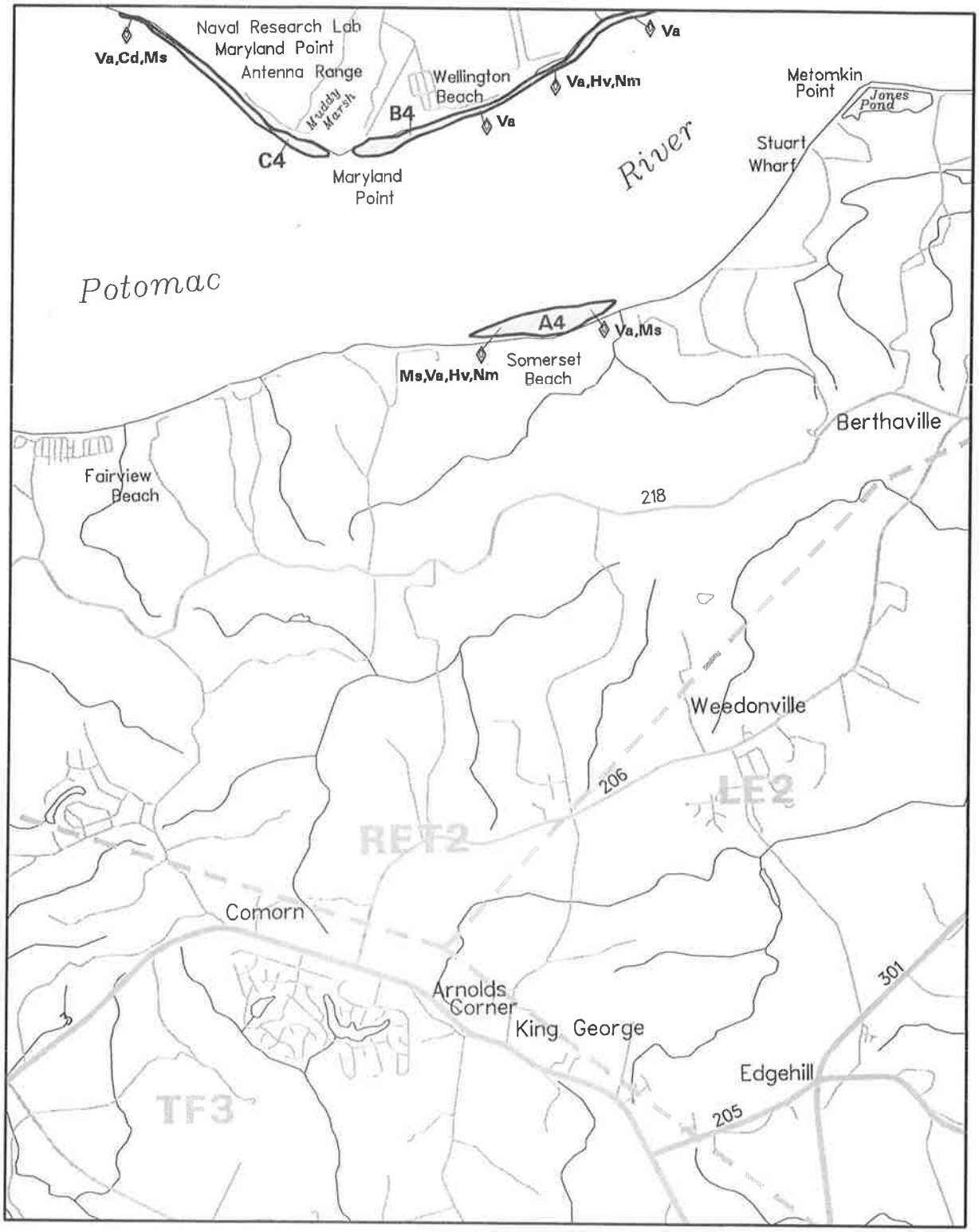
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(065) King George, Va.–Md.



1000 0 1000 2000 meters

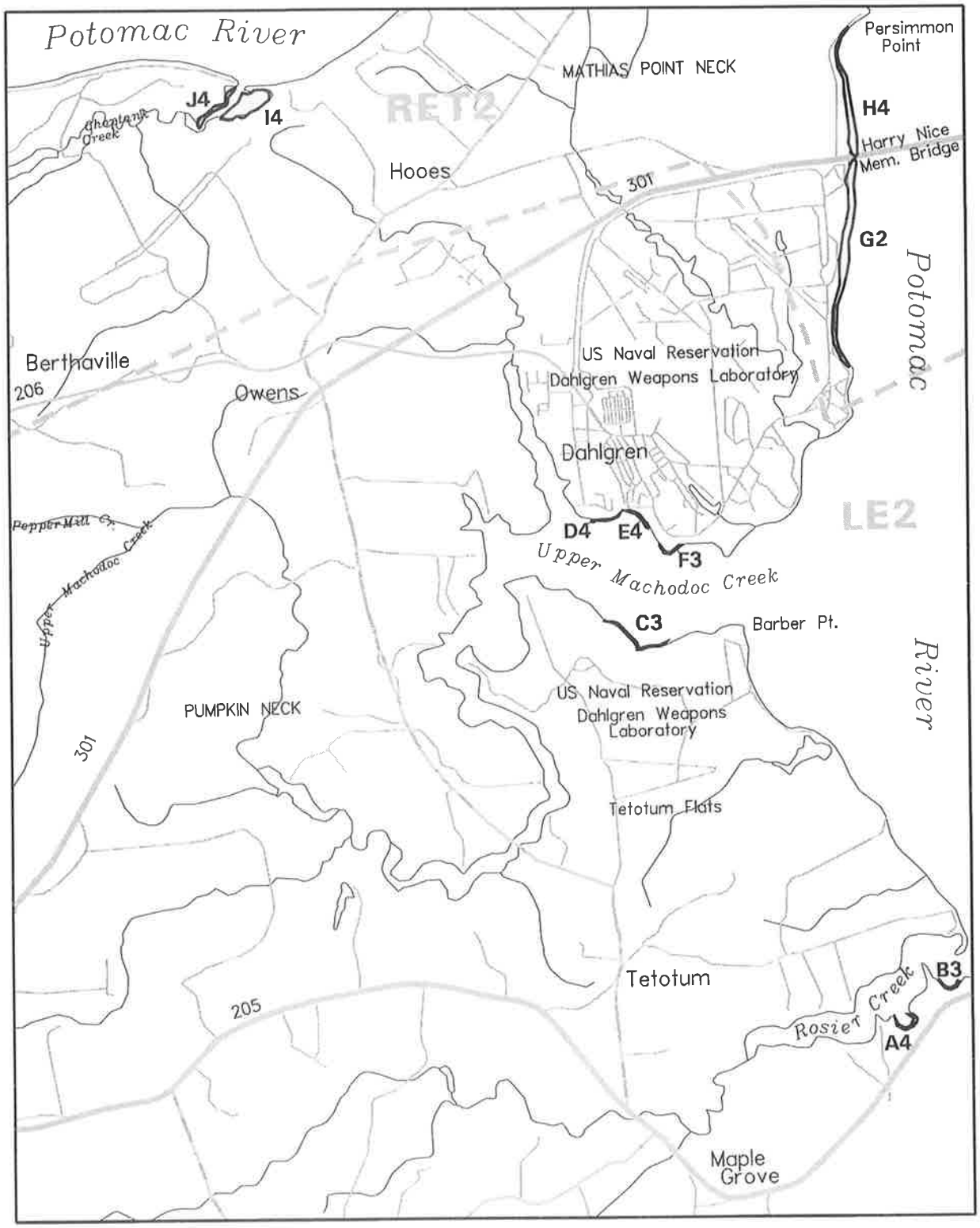
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95, 09/03/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Dahlgren, Va.–Md. (066)



1000 0 1000 2000 meters

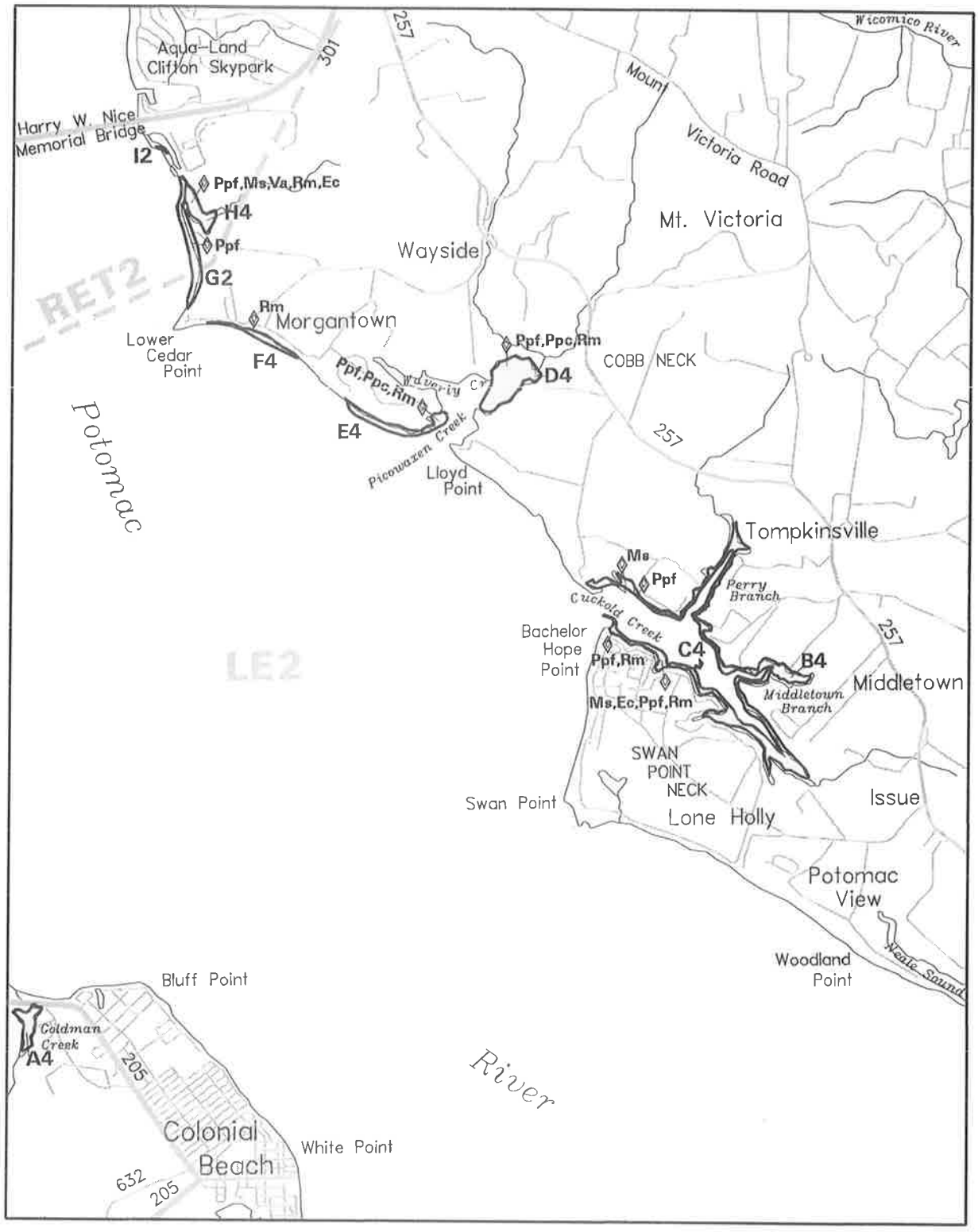
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(067) Colonial Beach North, Md.–Va.

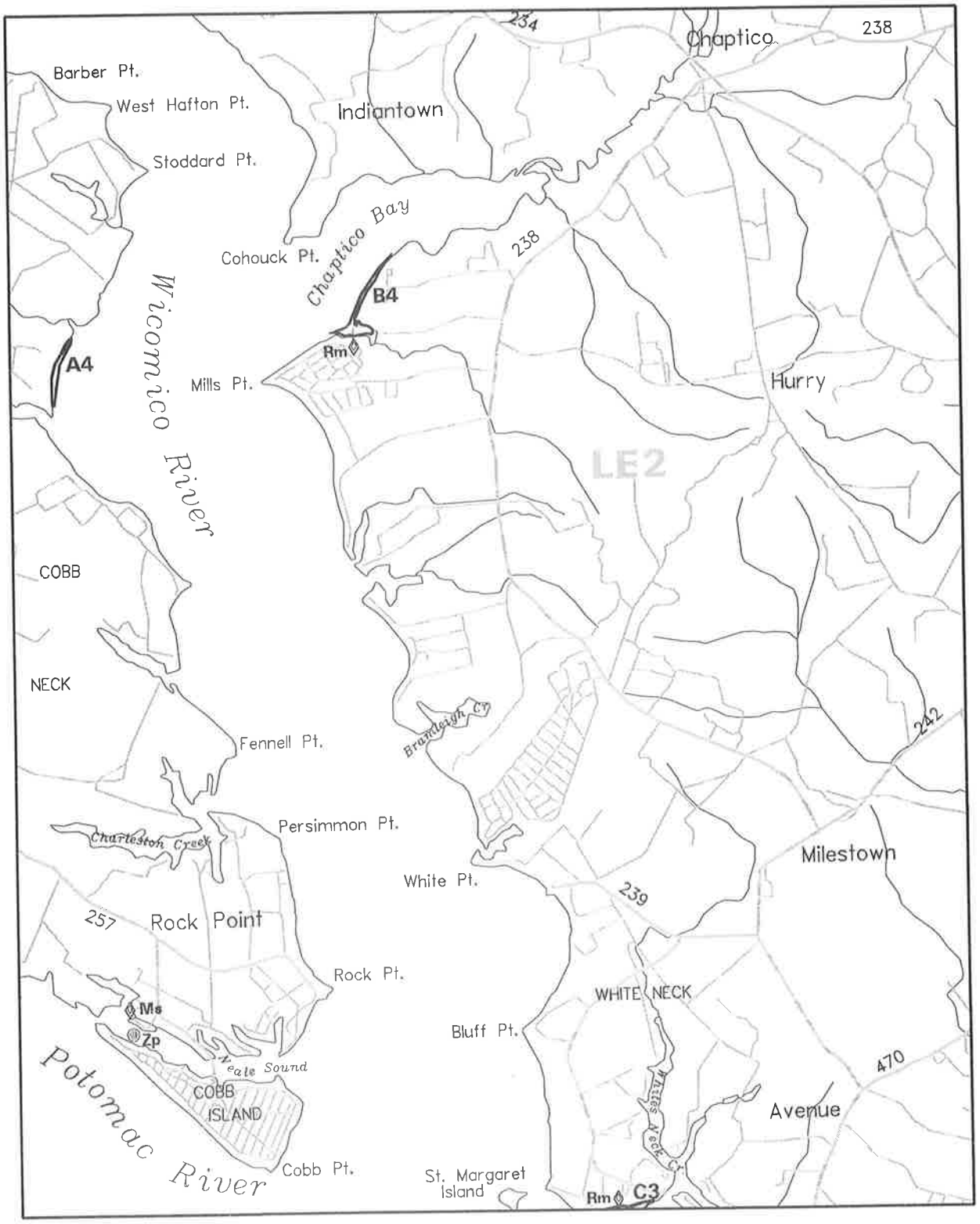


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/24/95, 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Rock Point, Md. (068)



1000 0 1000 2000 meters

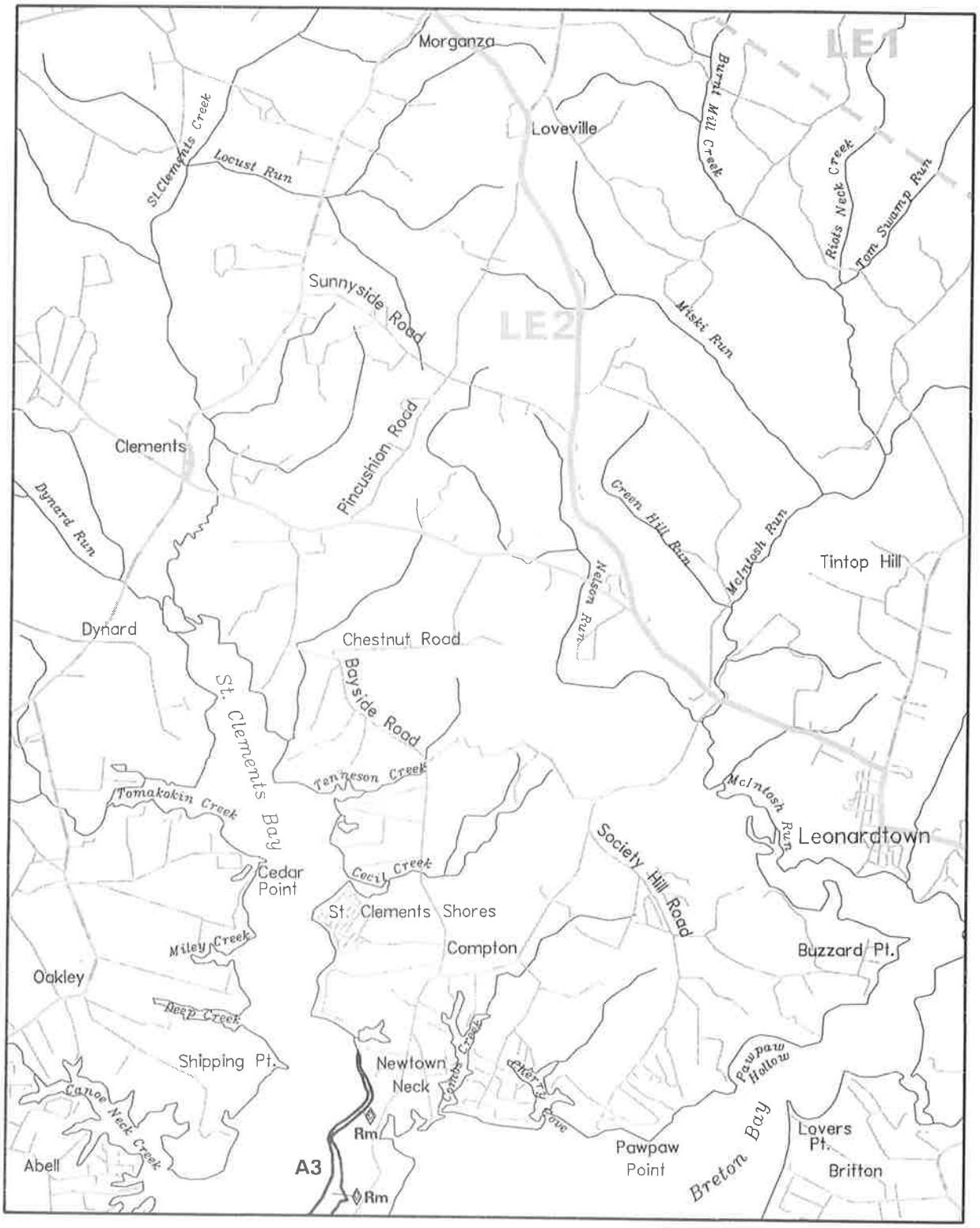
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/24/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(069) Leonardtown, Md.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/24/95

Produced by:
School of Marine Science
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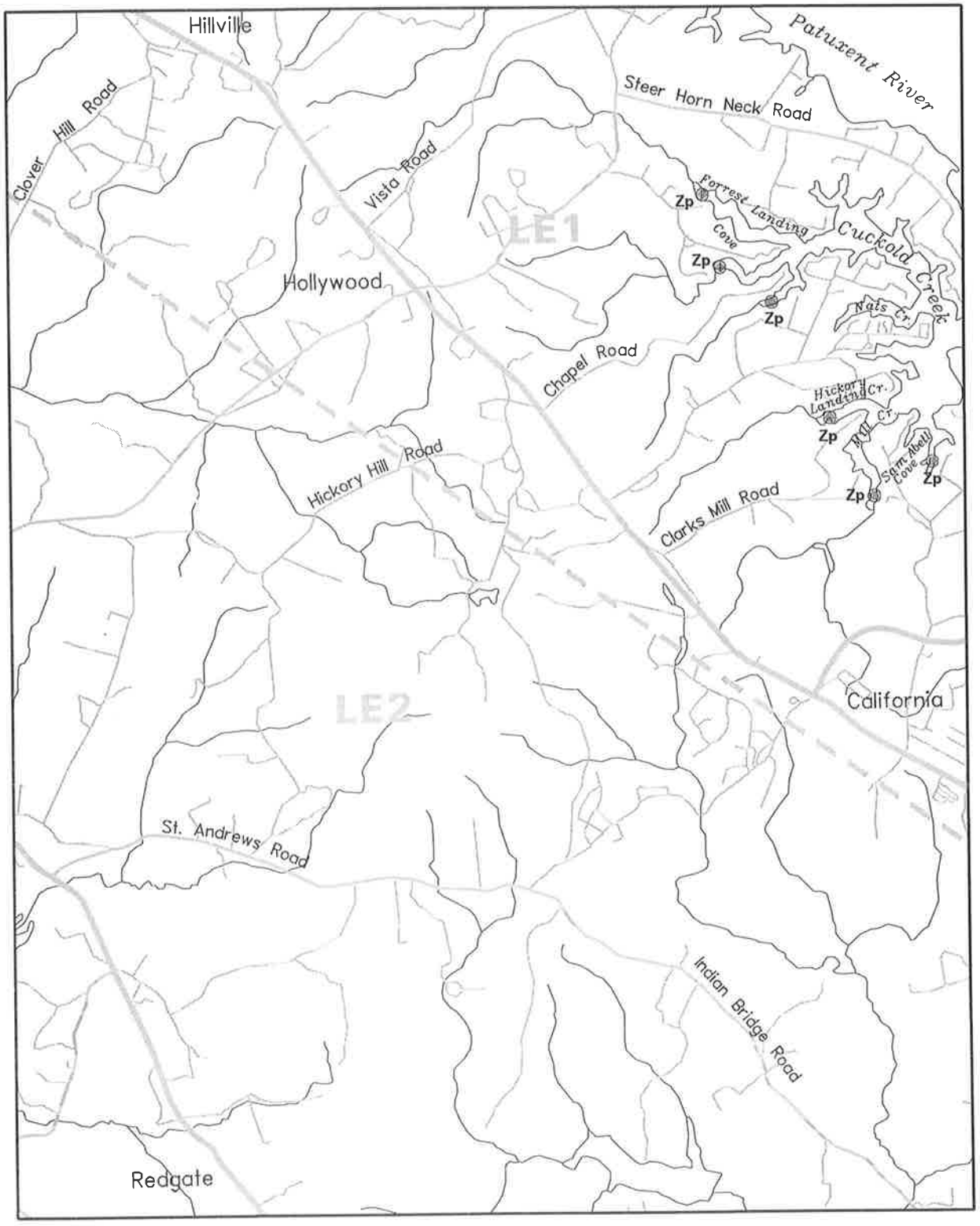
College of William and Mary

Submerged Aquatic Vegetation 1995

Hollywood, Md. (070)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/30/95

Produced by:
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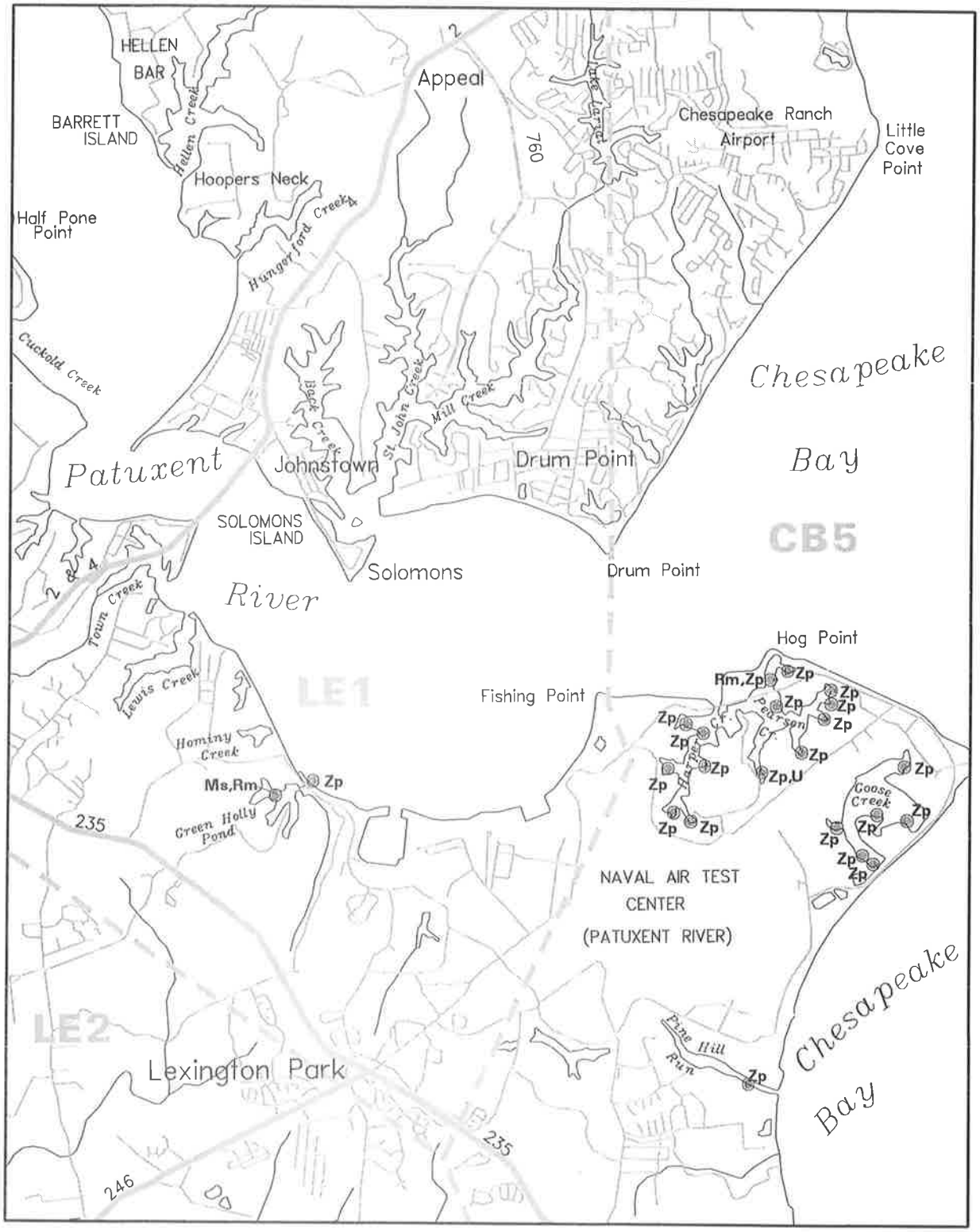
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(071) Solomons Island, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/30/95

Produced by:
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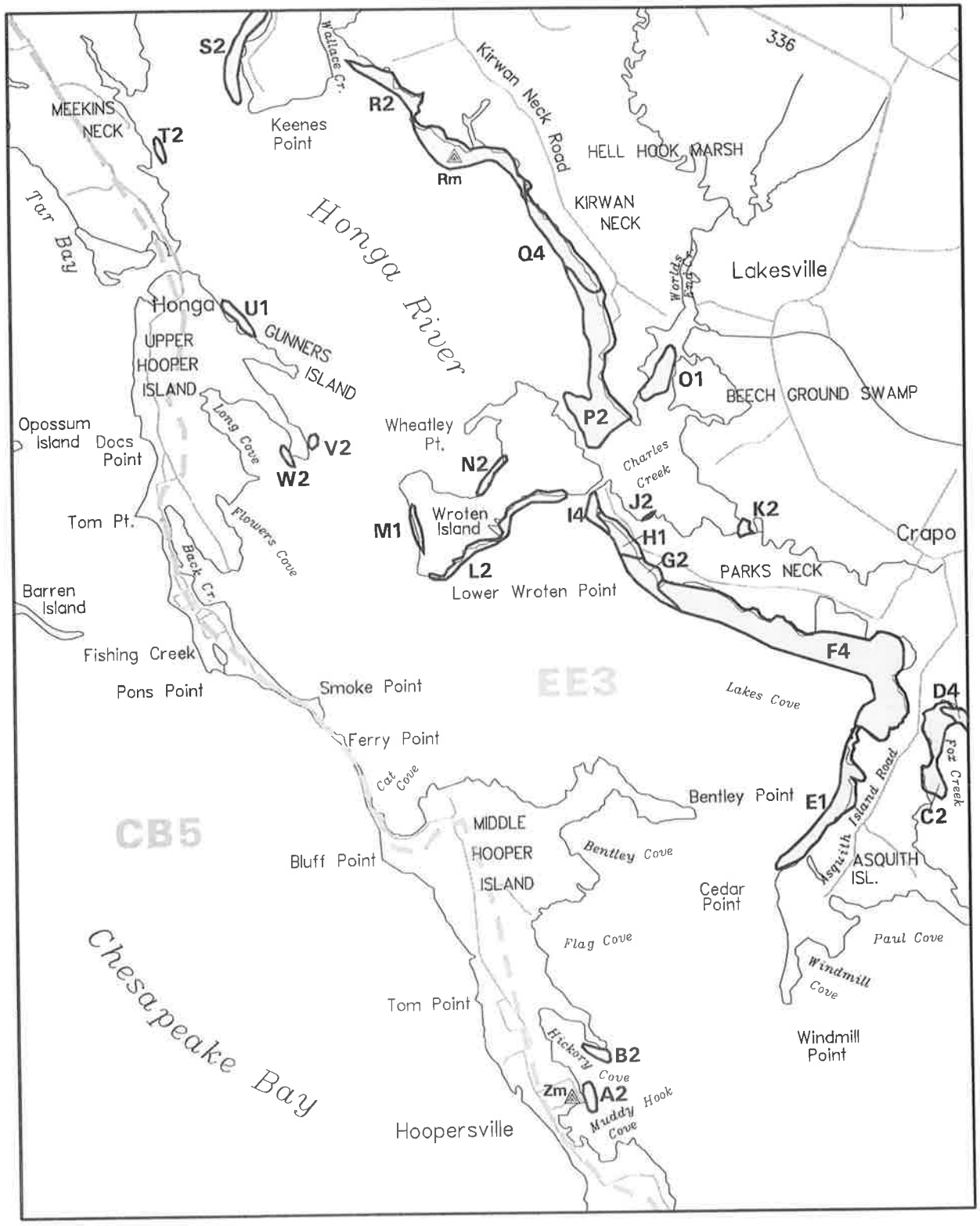
Submerged Aquatic Vegetation 1995

Honga, Md. (073)



1000 0 1000 2000 meters

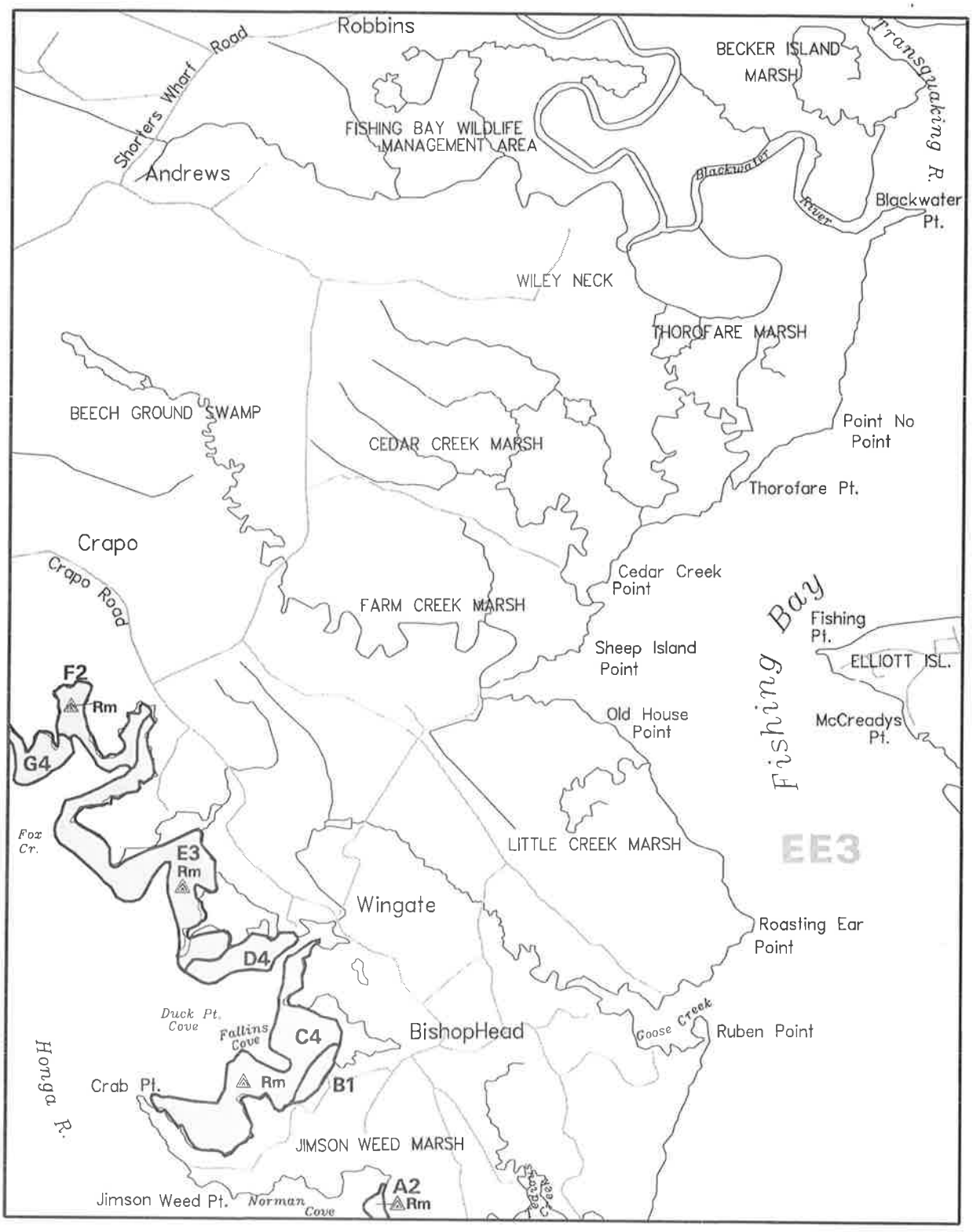
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95, 07/24/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(074) Wingate, Md.



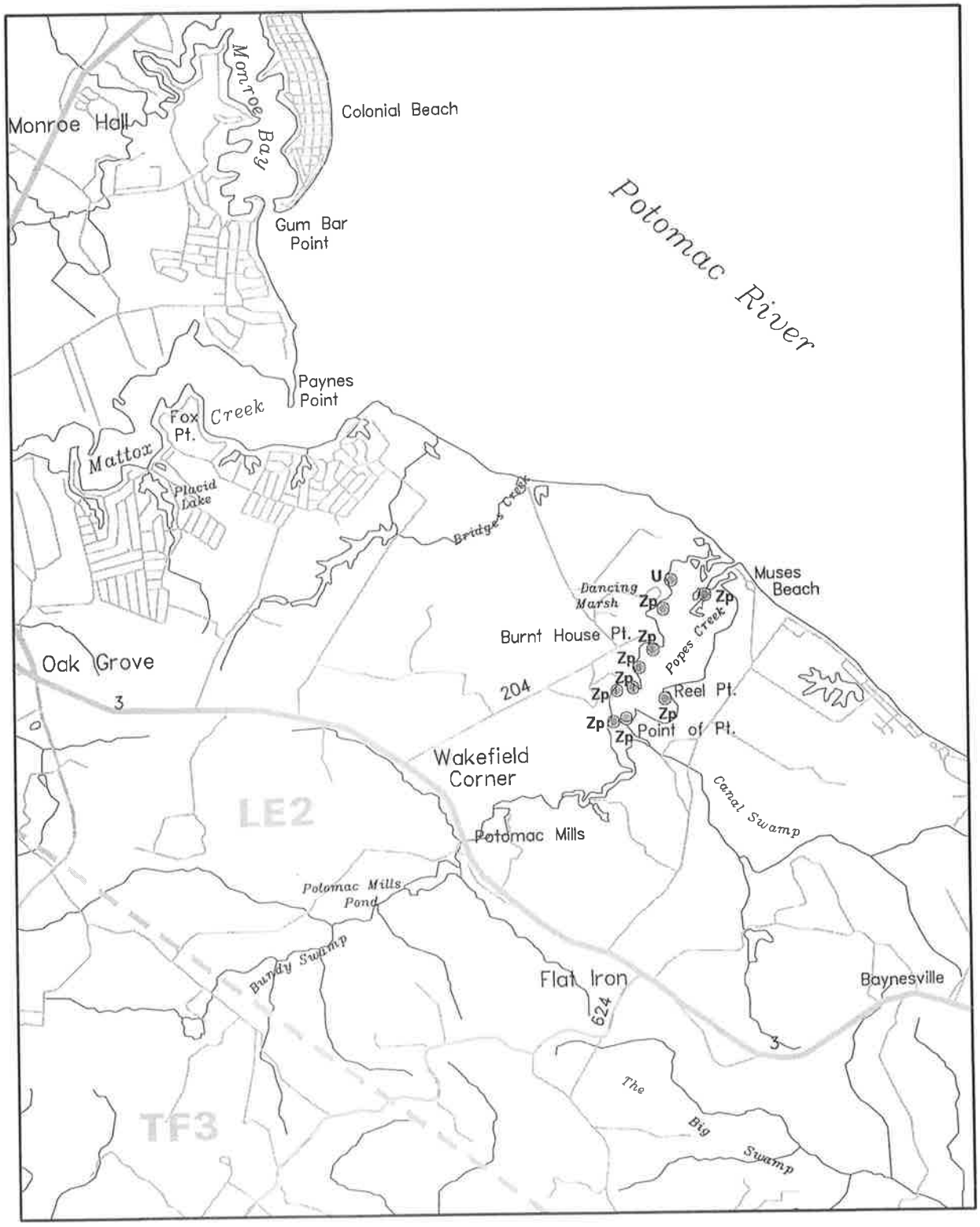
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Colonial Beach South, Va.–Md. (076)



1000 0 1000 2000 meters

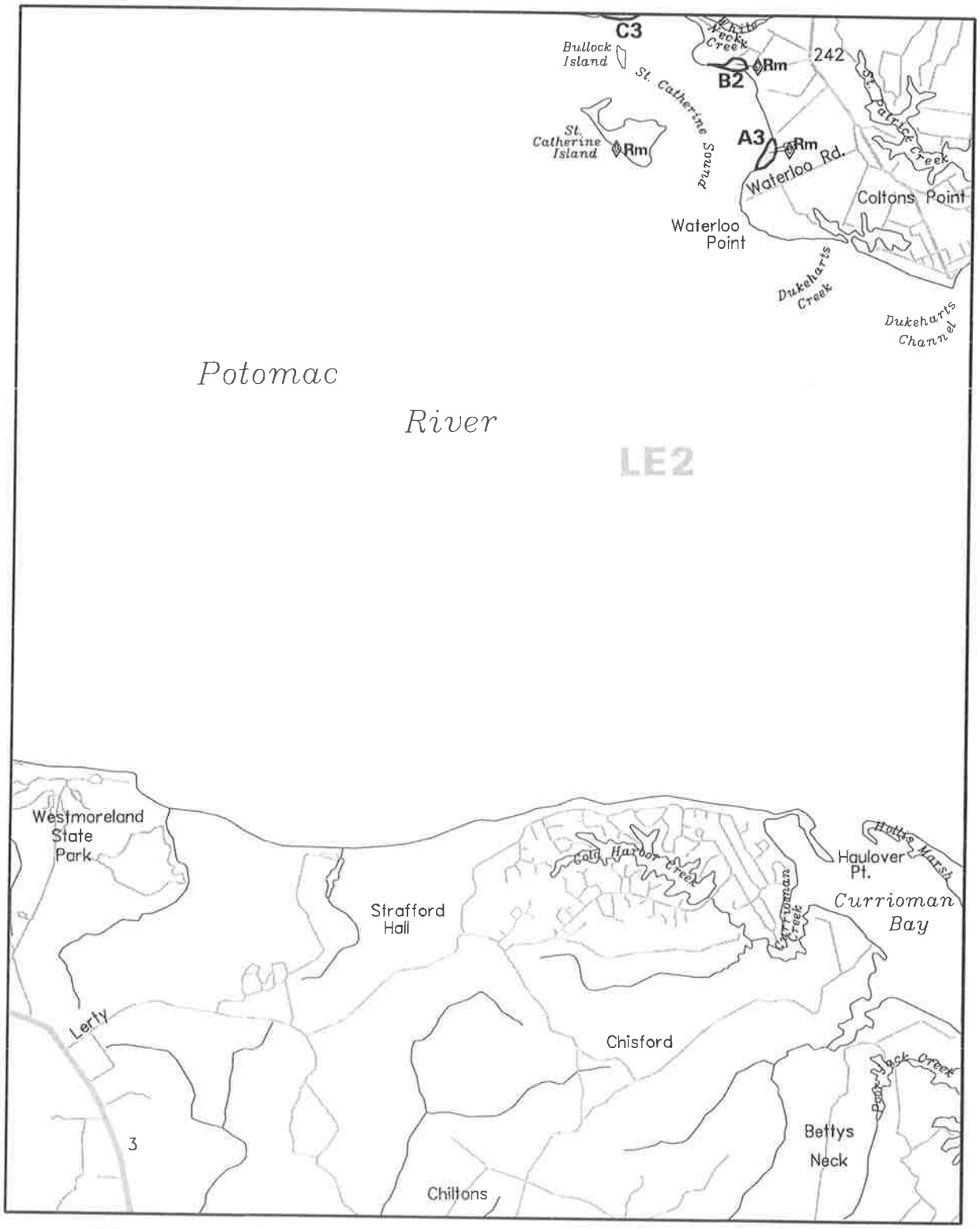
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 08/12/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(077) Stratford Hall, Va.–Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 07/24/95

Produced by:
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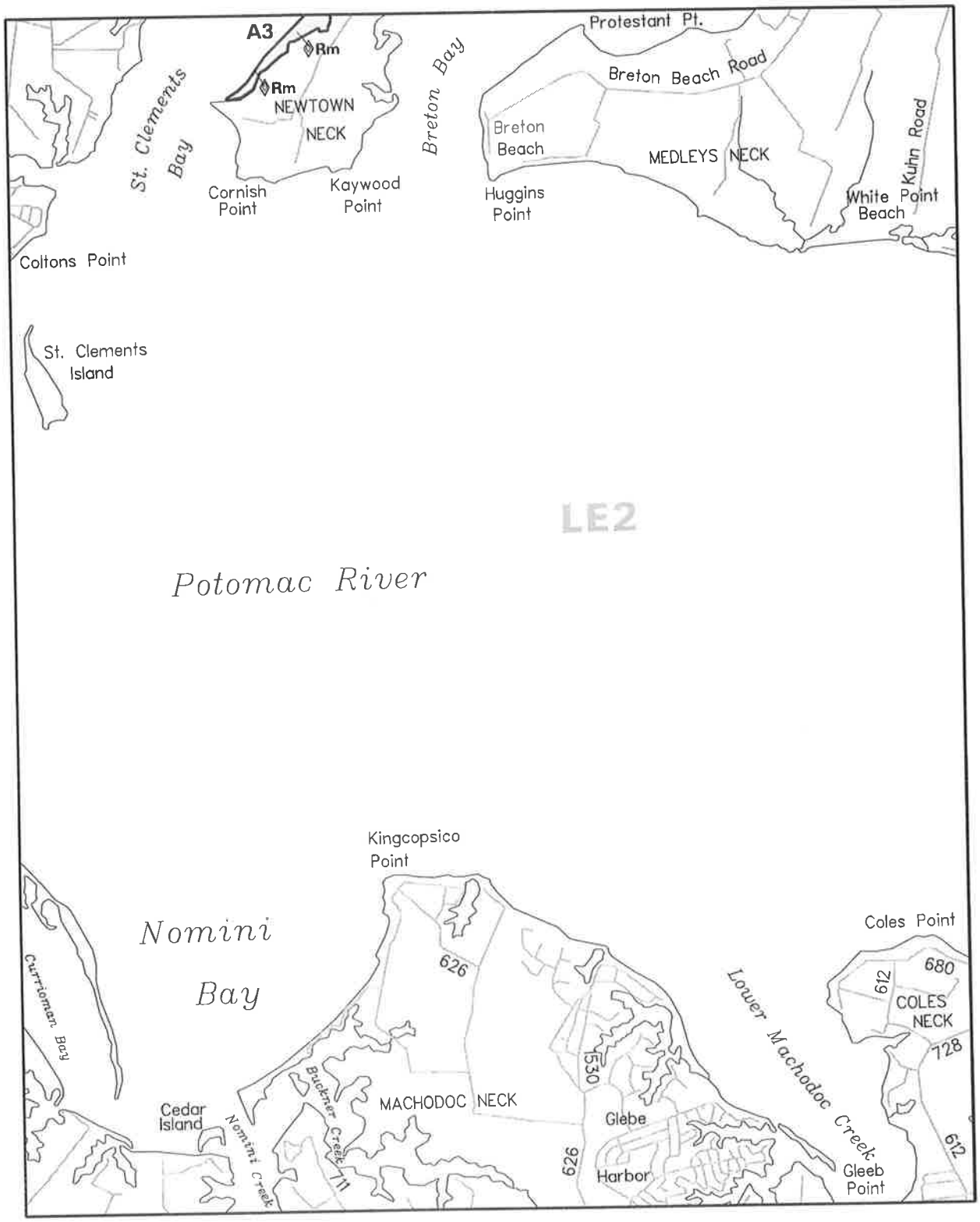
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

St. Clements Island, Va.–Md. (078)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/30/95

Produced by:
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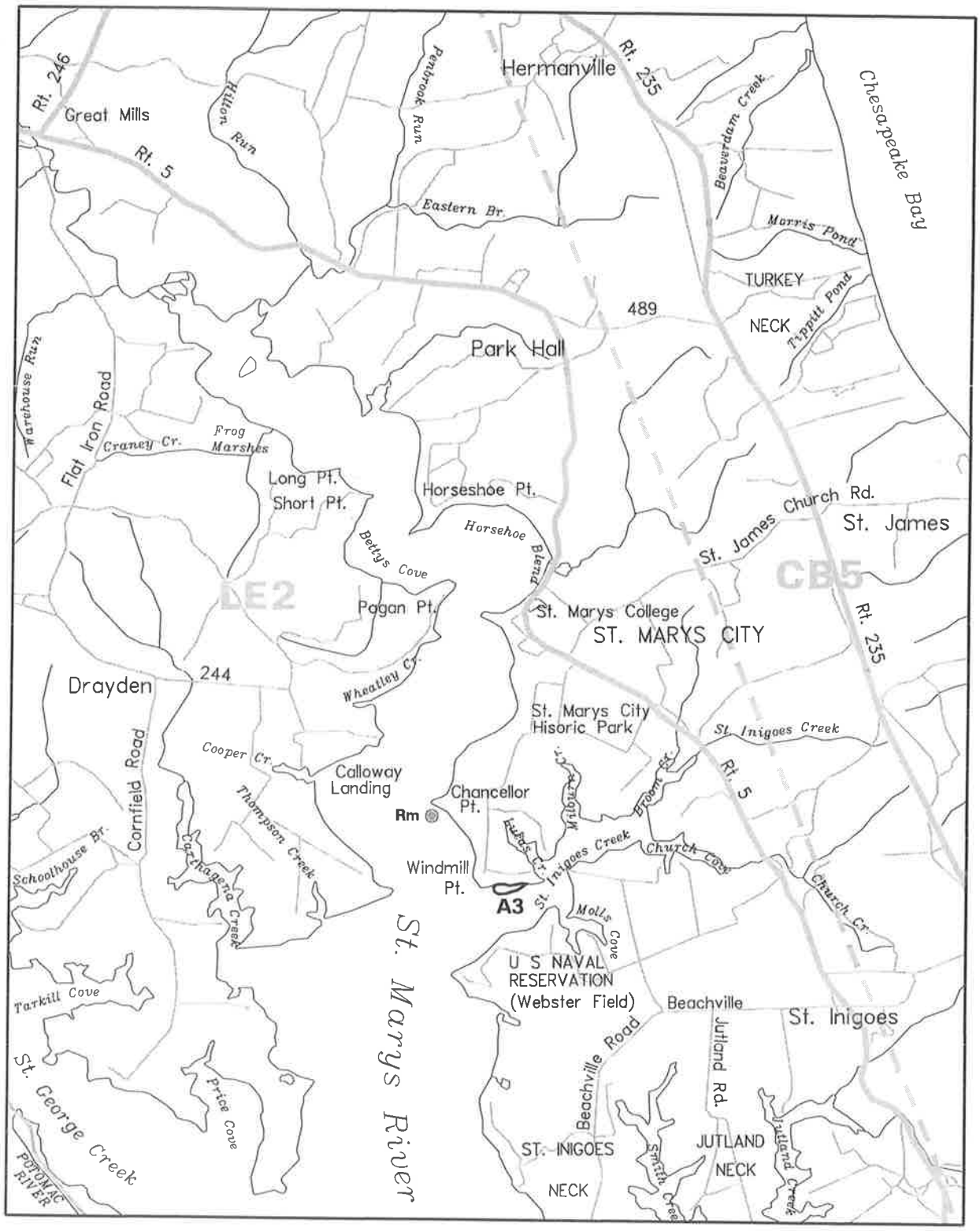
Submerged Aquatic Vegetation 1995

(080) St. Marys City, Md.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/30/95

Produced by:
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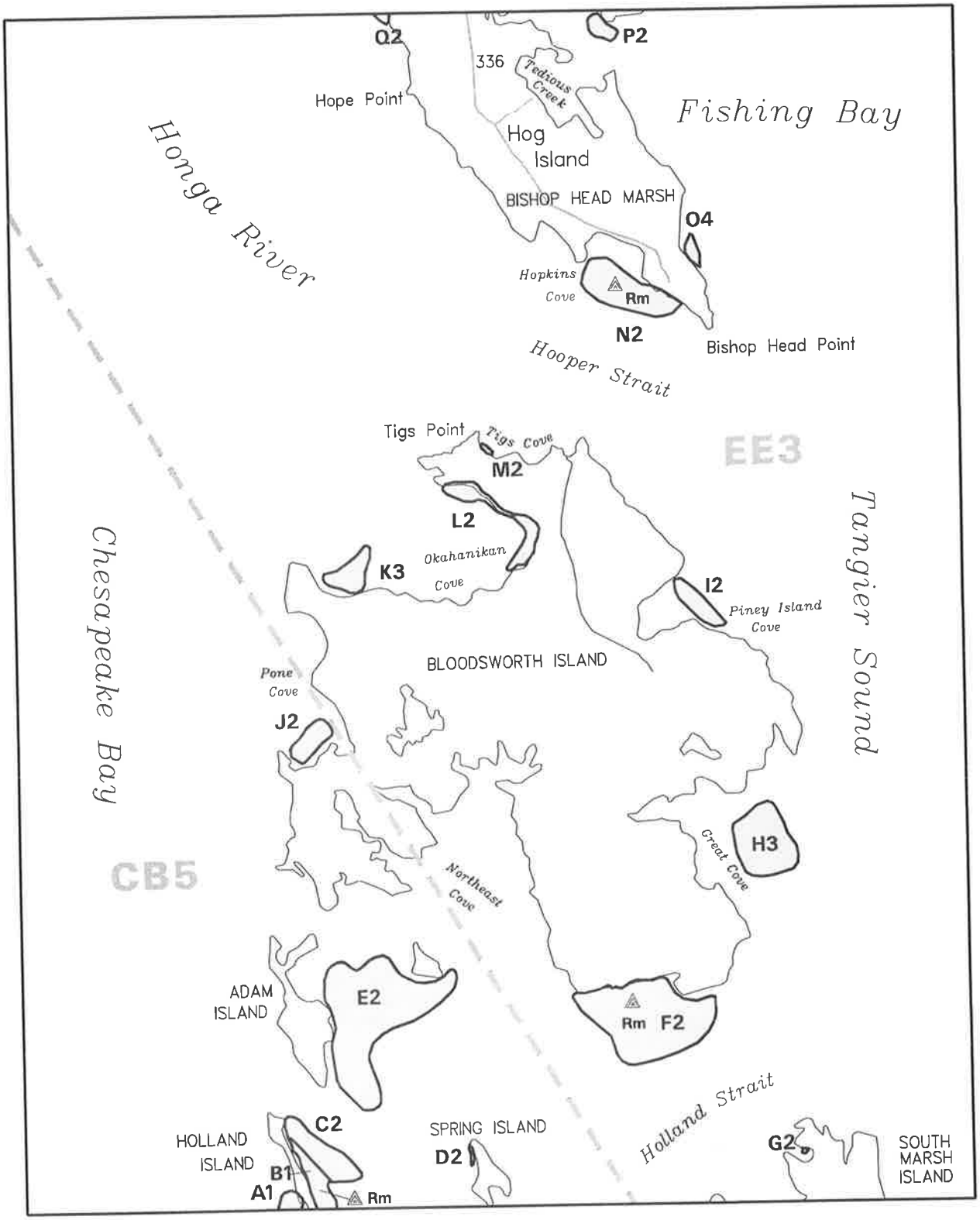
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Bloodsworth Island, Md. (083)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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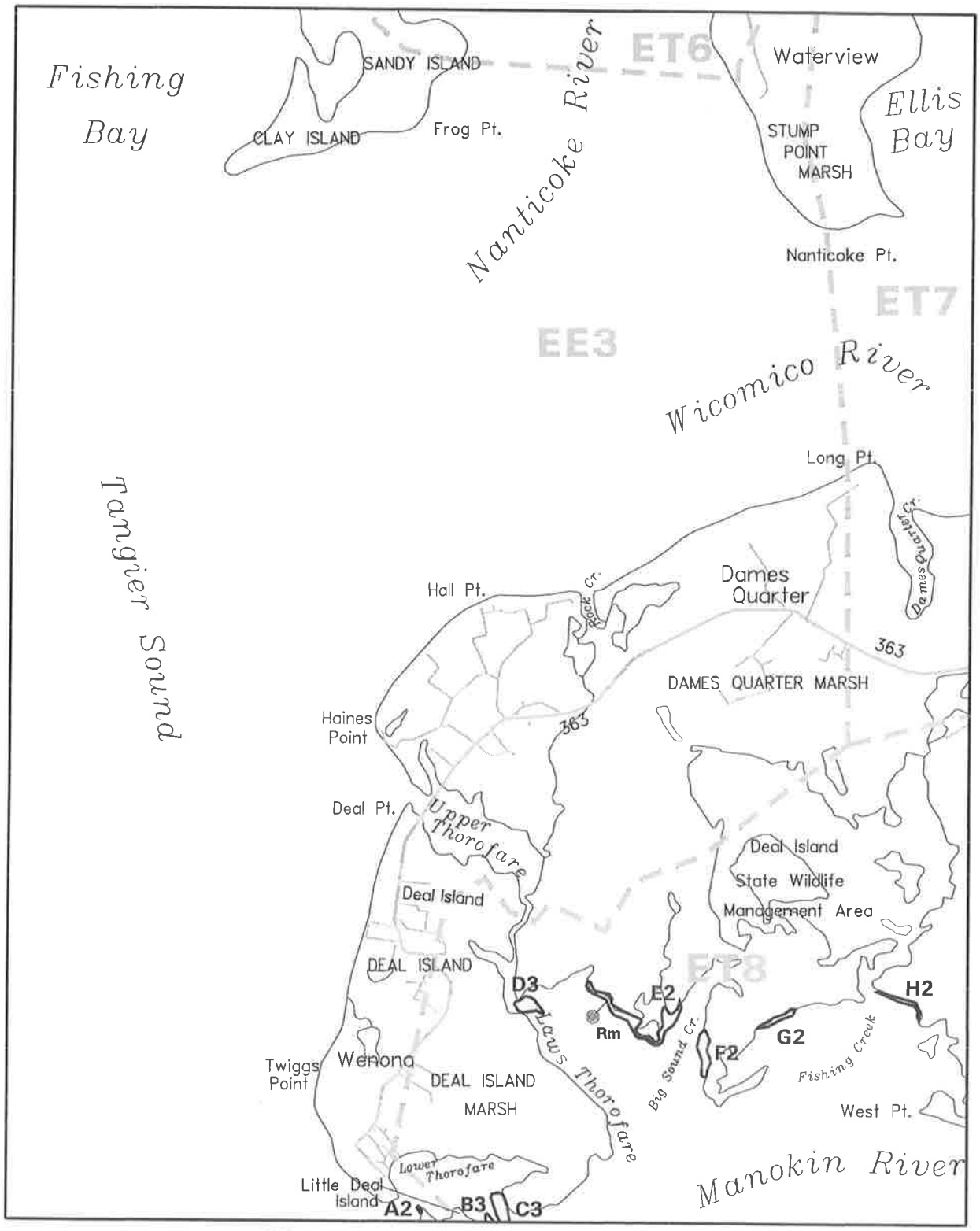
College of William and Mary

Submerged Aquatic Vegetation 1995

(084) Deal Island, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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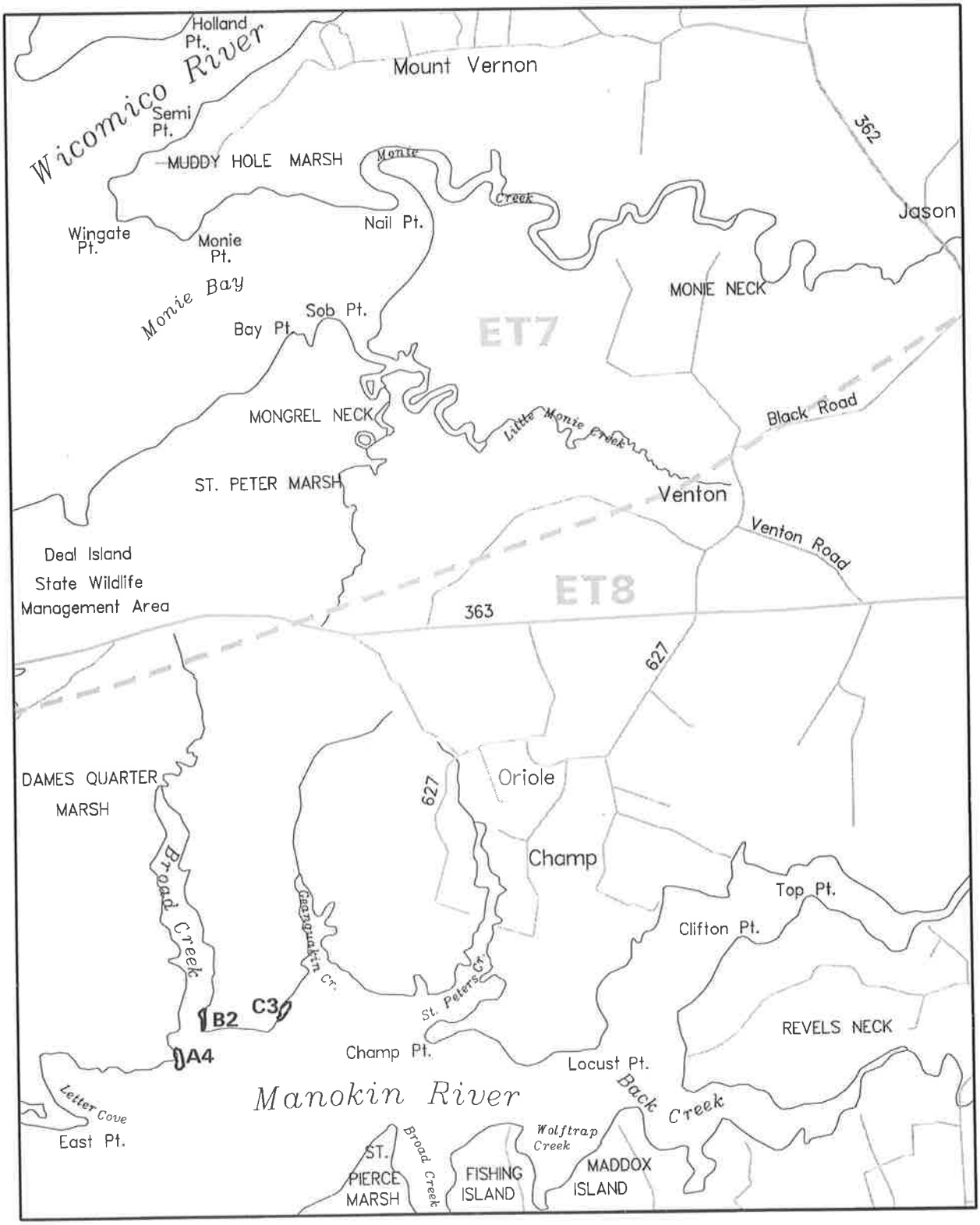
College of William and Mary

Submerged Aquatic Vegetation 1995

Monie, Md. (085)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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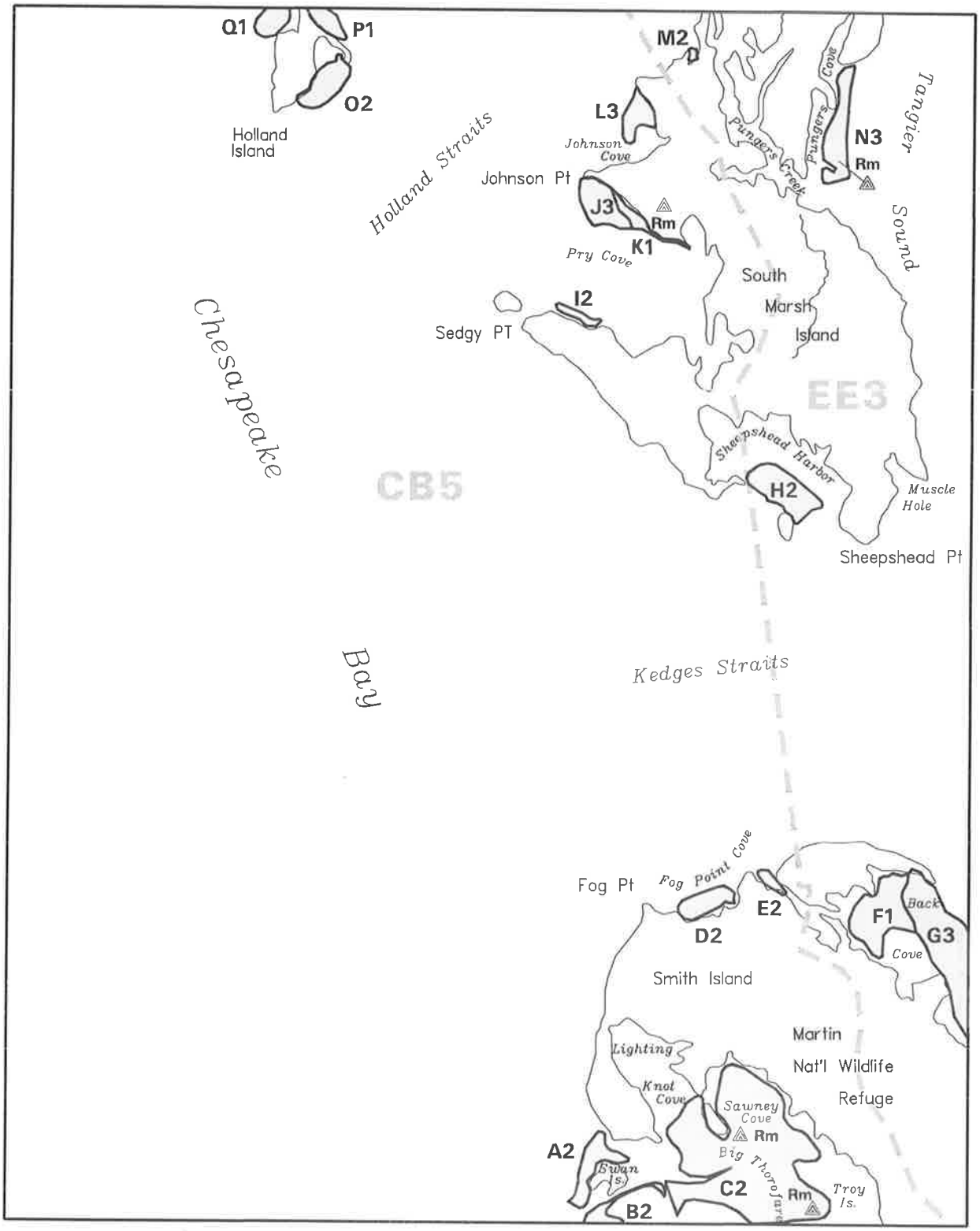
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(091) Kedges Straits, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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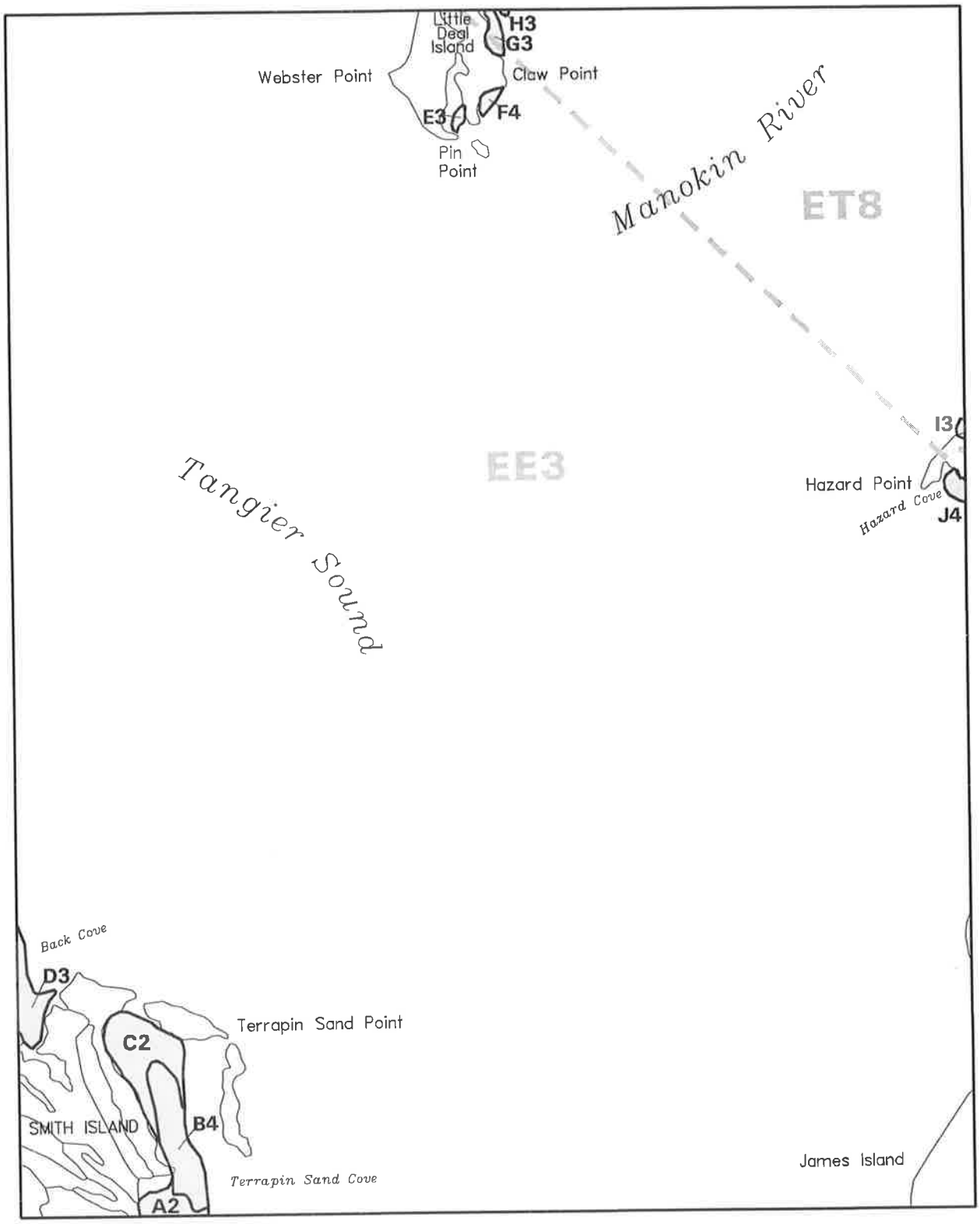
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Terrapin Sand Point, Md. (092)

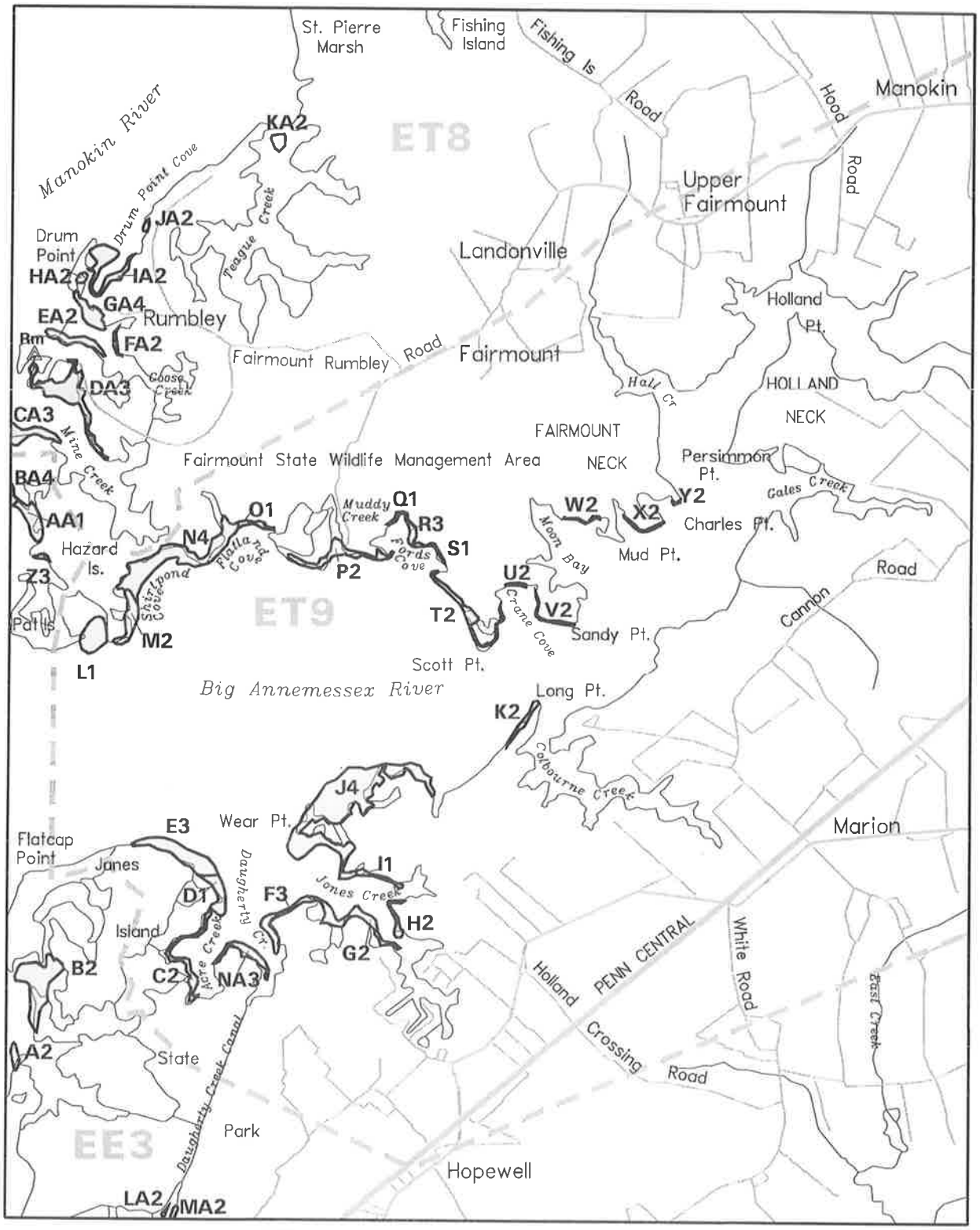


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(093) Marion, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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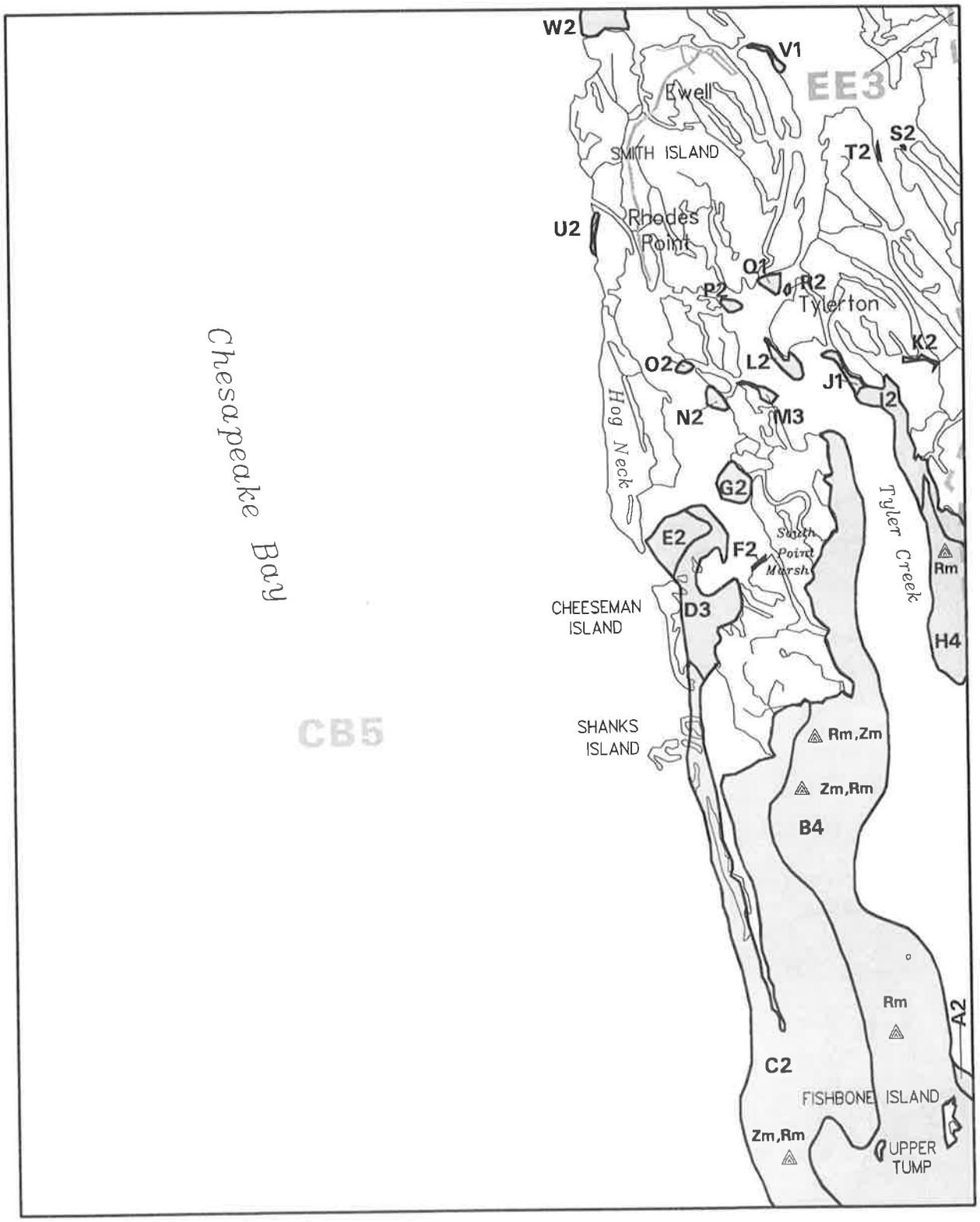
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Ewell, Md.–Va. (099)



1000 0 1000 2000 meters

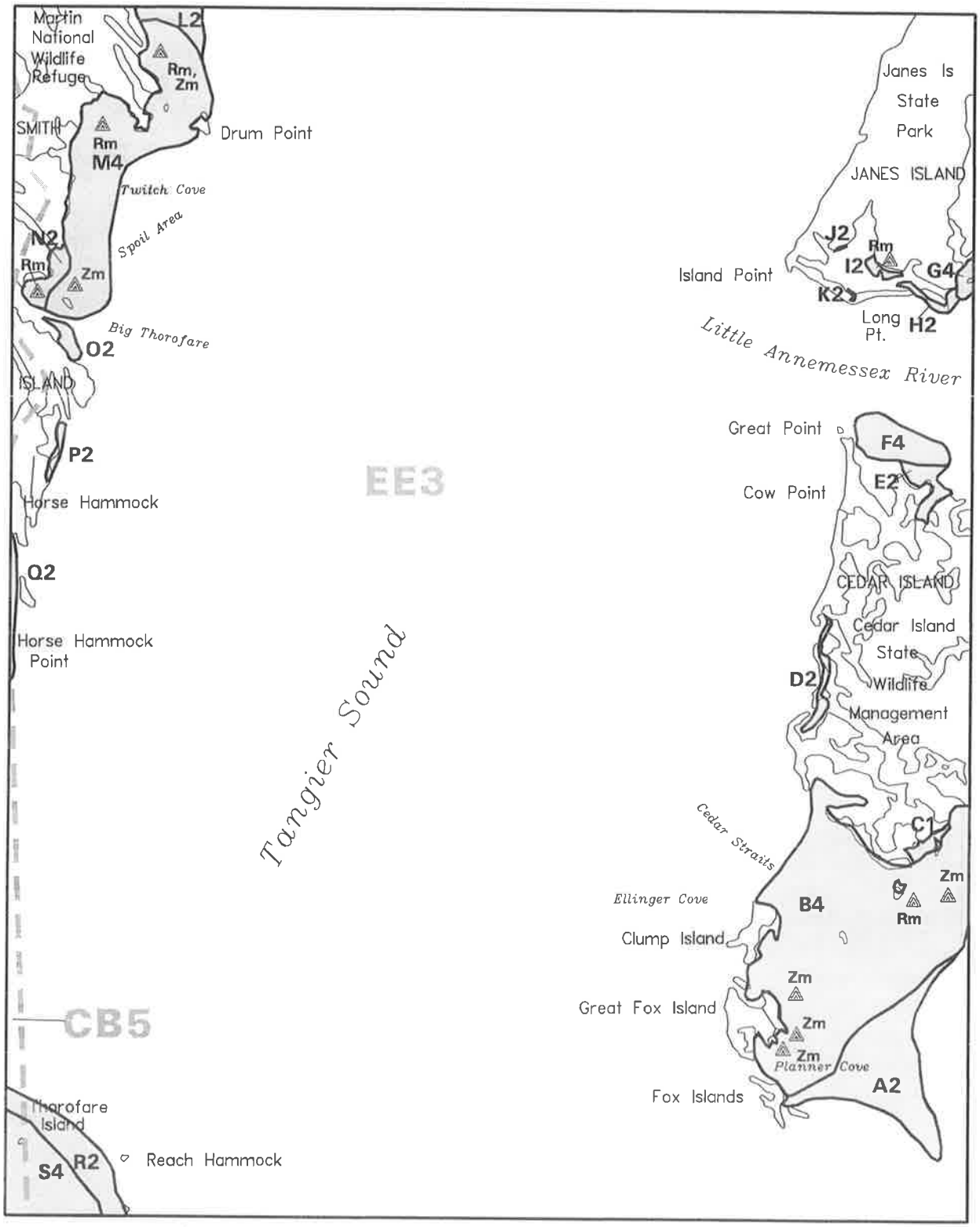
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(100) Great Fox Island, Va.–Md.



1000 0 1000 2000 meters

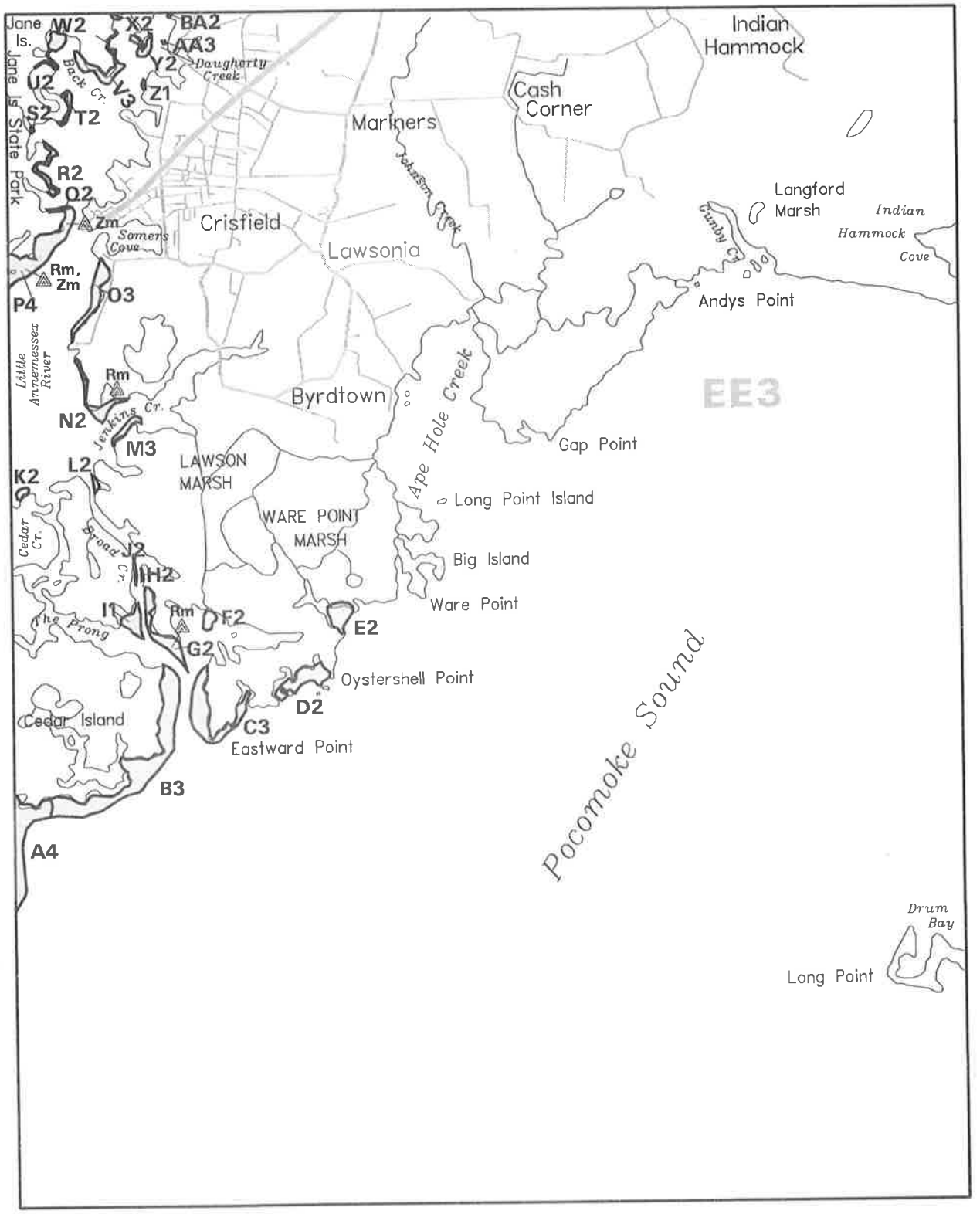
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Crisfield, Md.–Va. (101)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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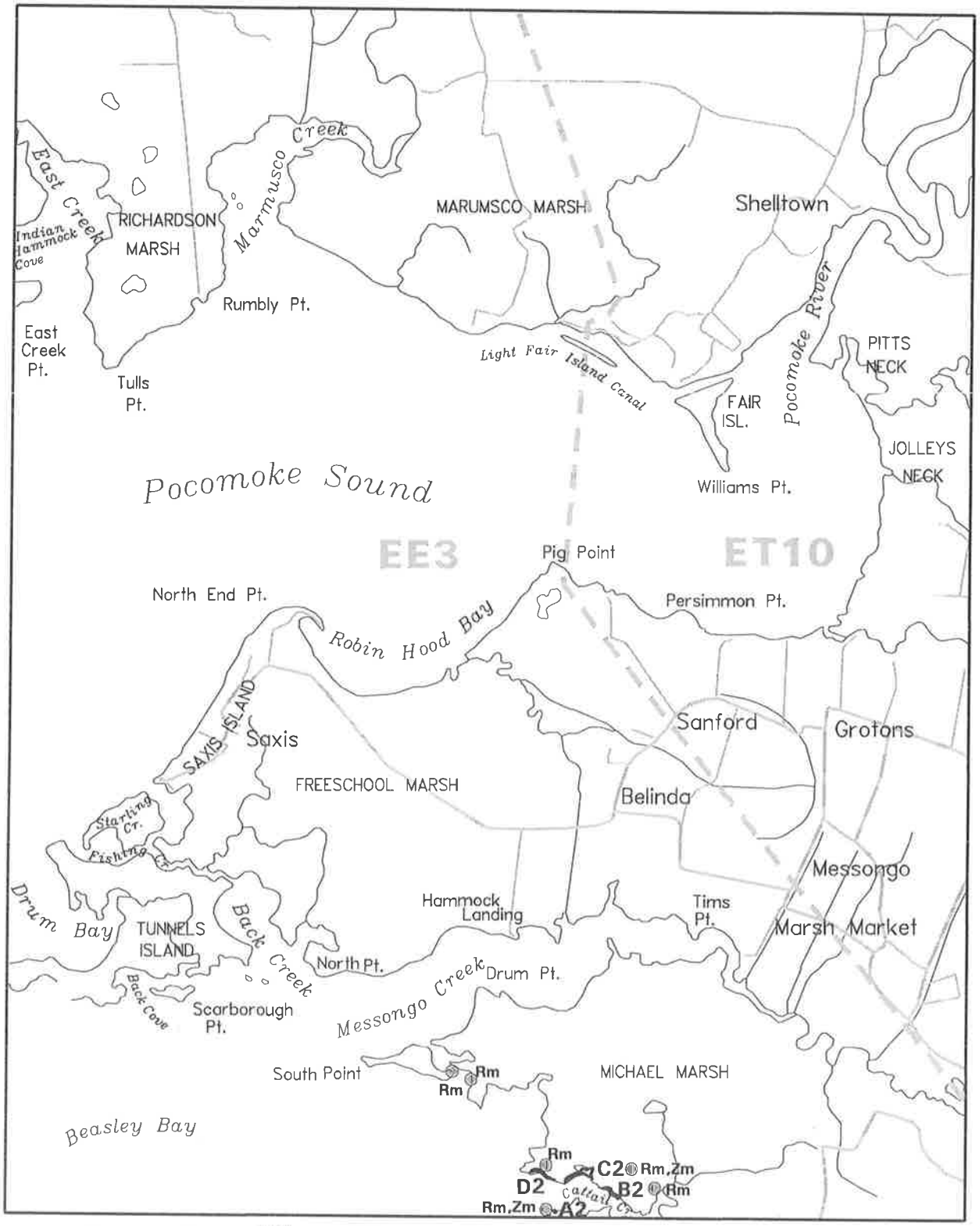
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(102) Saxis, Va.–Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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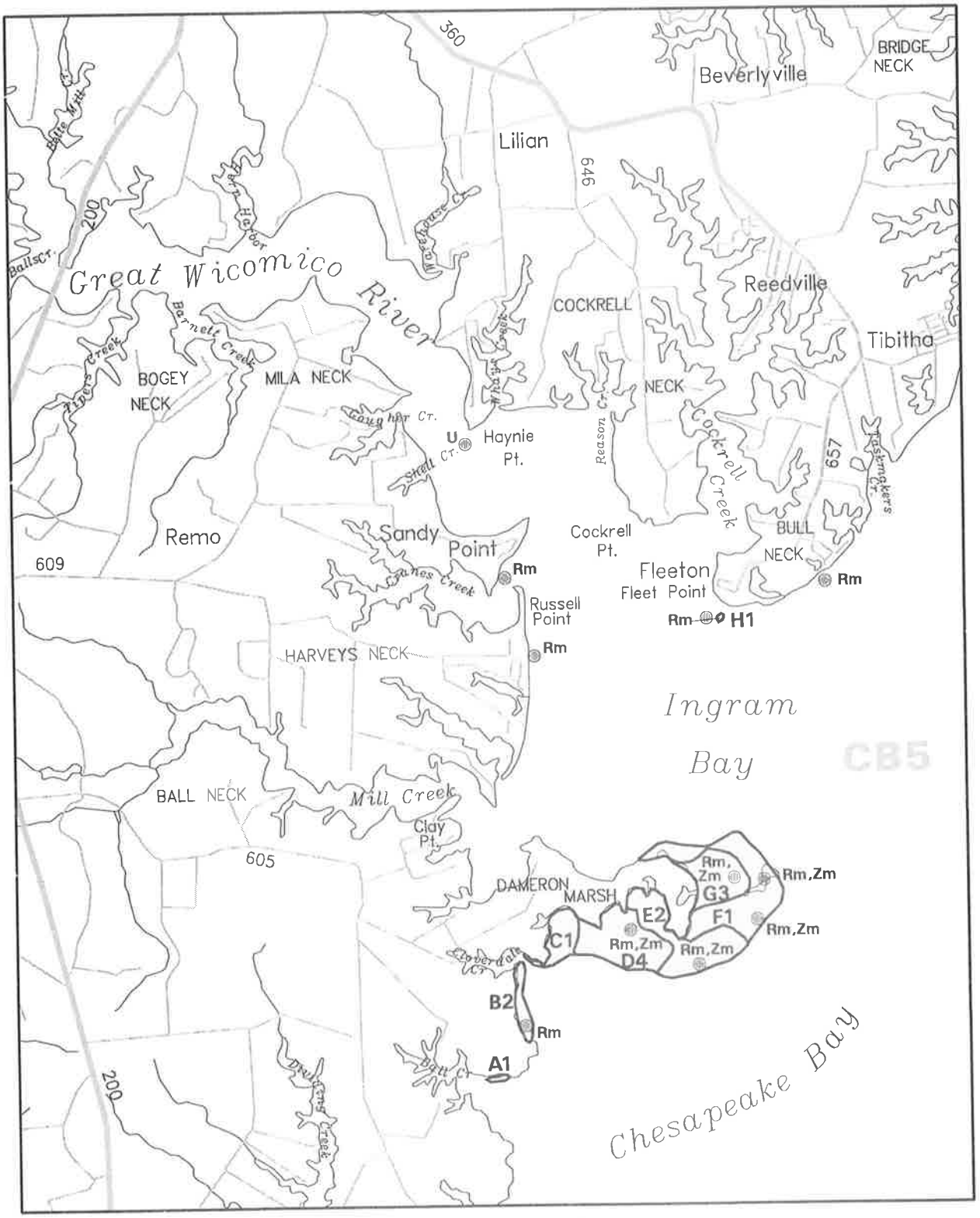
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Reedville, Va. (106)



1000 0 1000 2000 meters

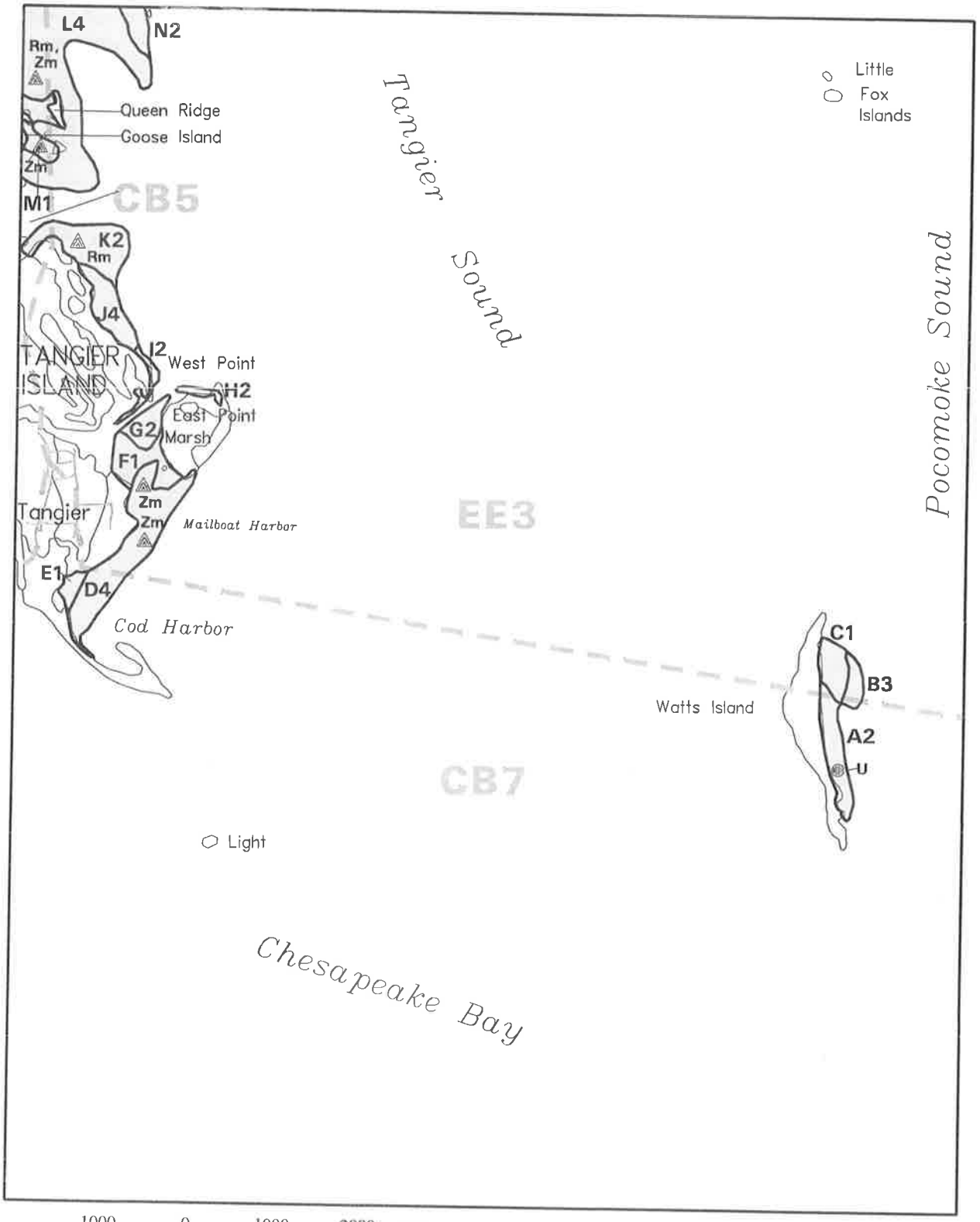
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/16/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(107) Tangier Island, Va.



1000 0 1000 2000 meters

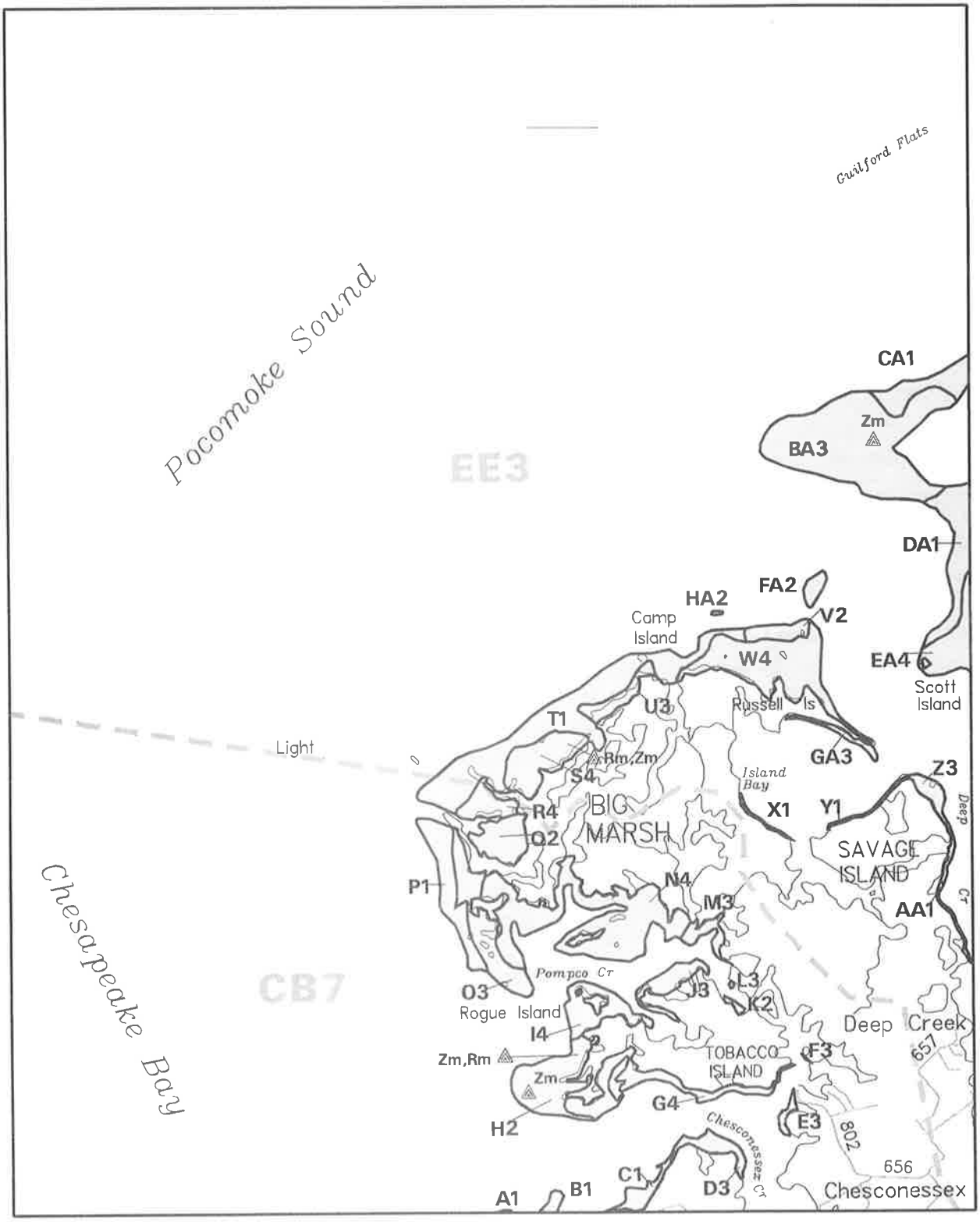
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Chesconessex, Va. (108)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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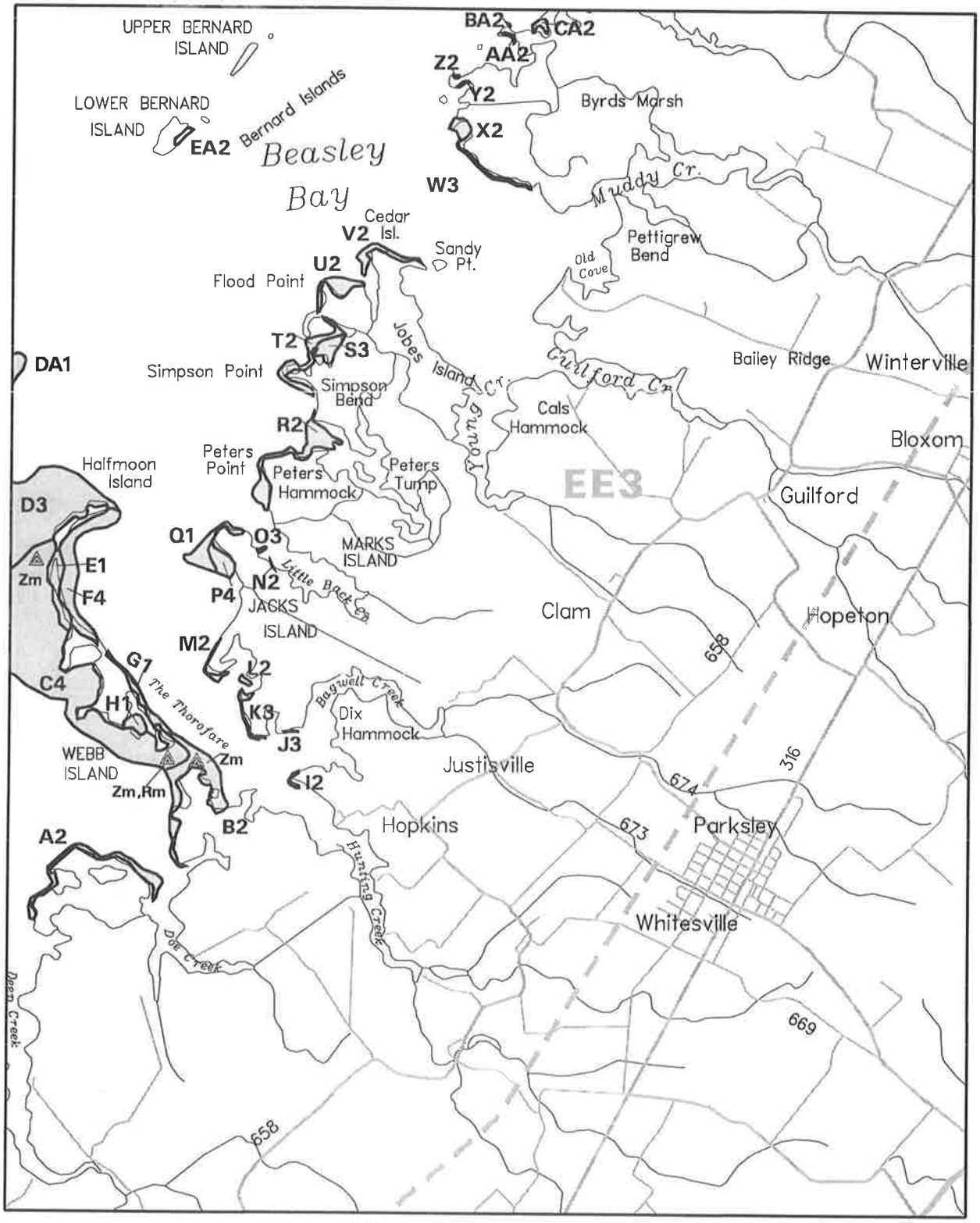
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(109) Parksley, Va.

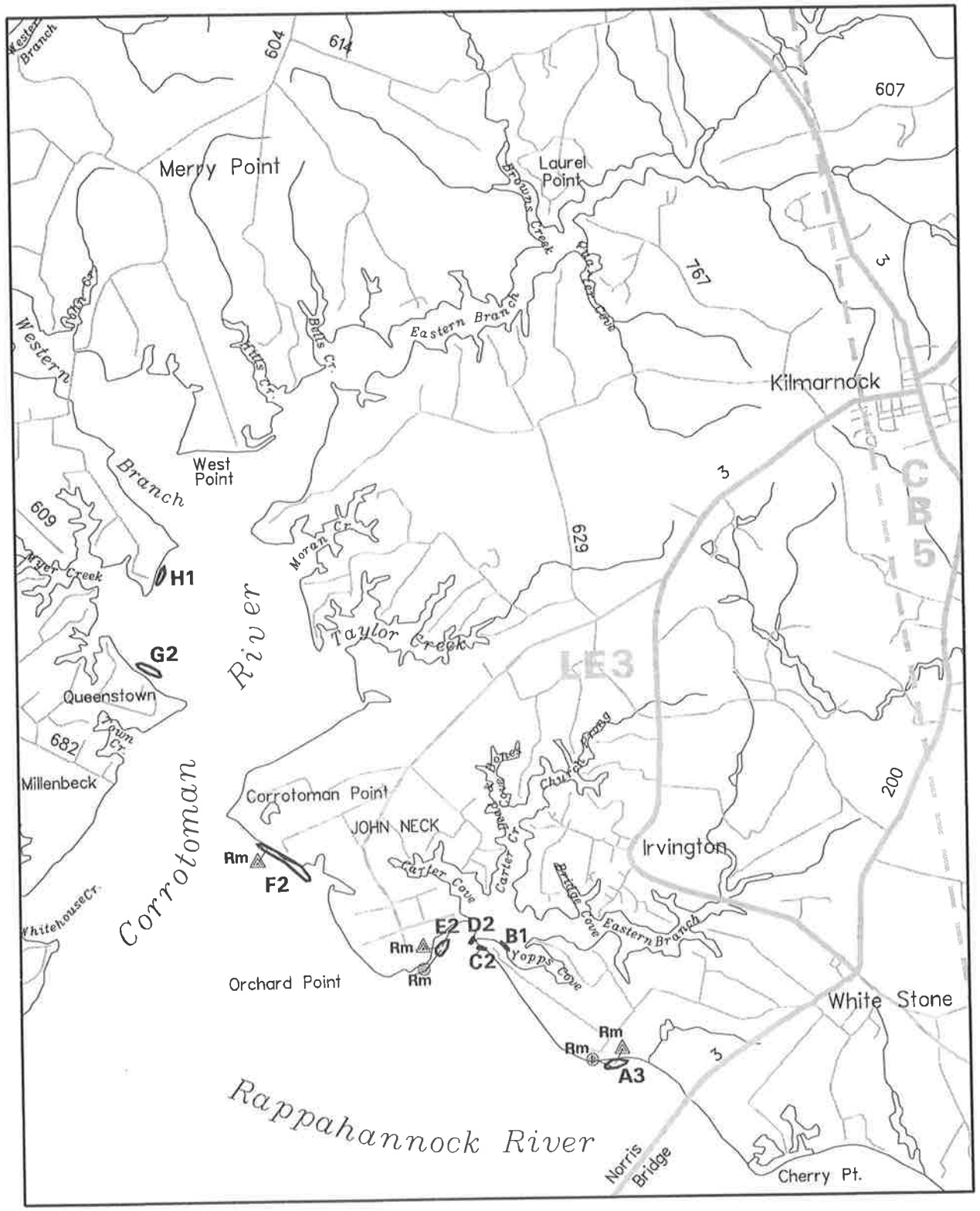


Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Irvington, Va. (111)



1000 0 1000 2000 meters

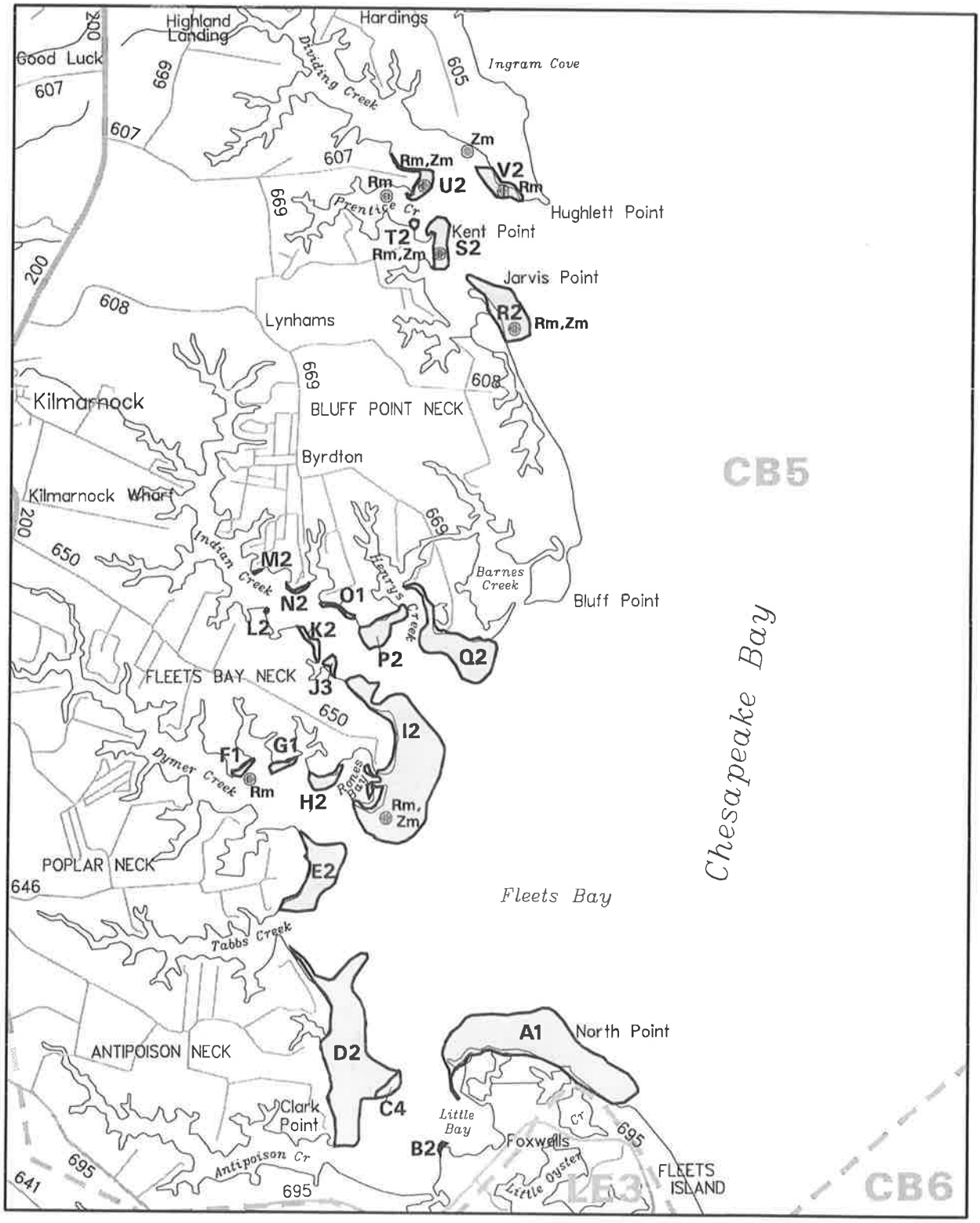
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/16/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(112) Fleets Bay, Va.



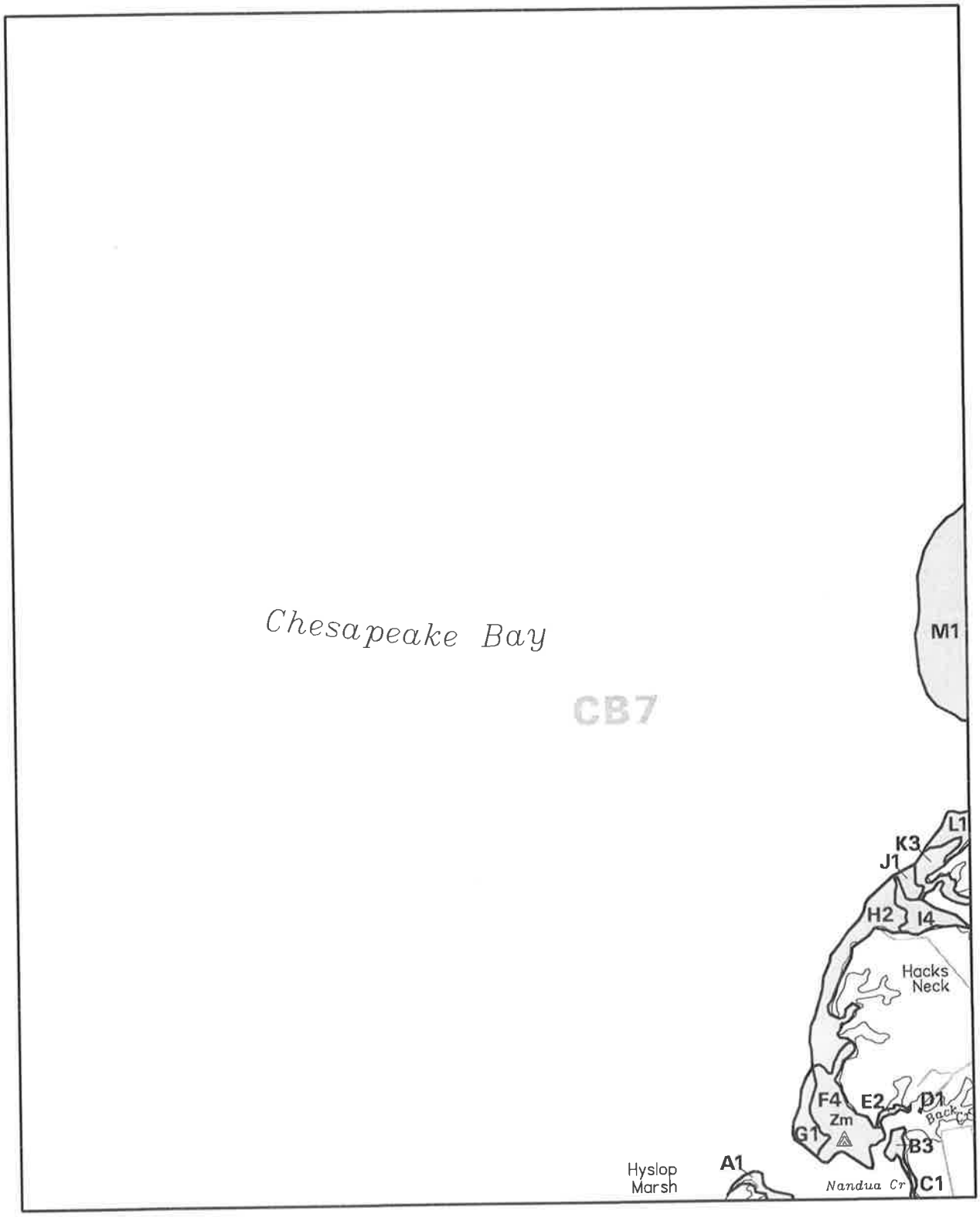
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/16/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Nandua Creek, Va. (113)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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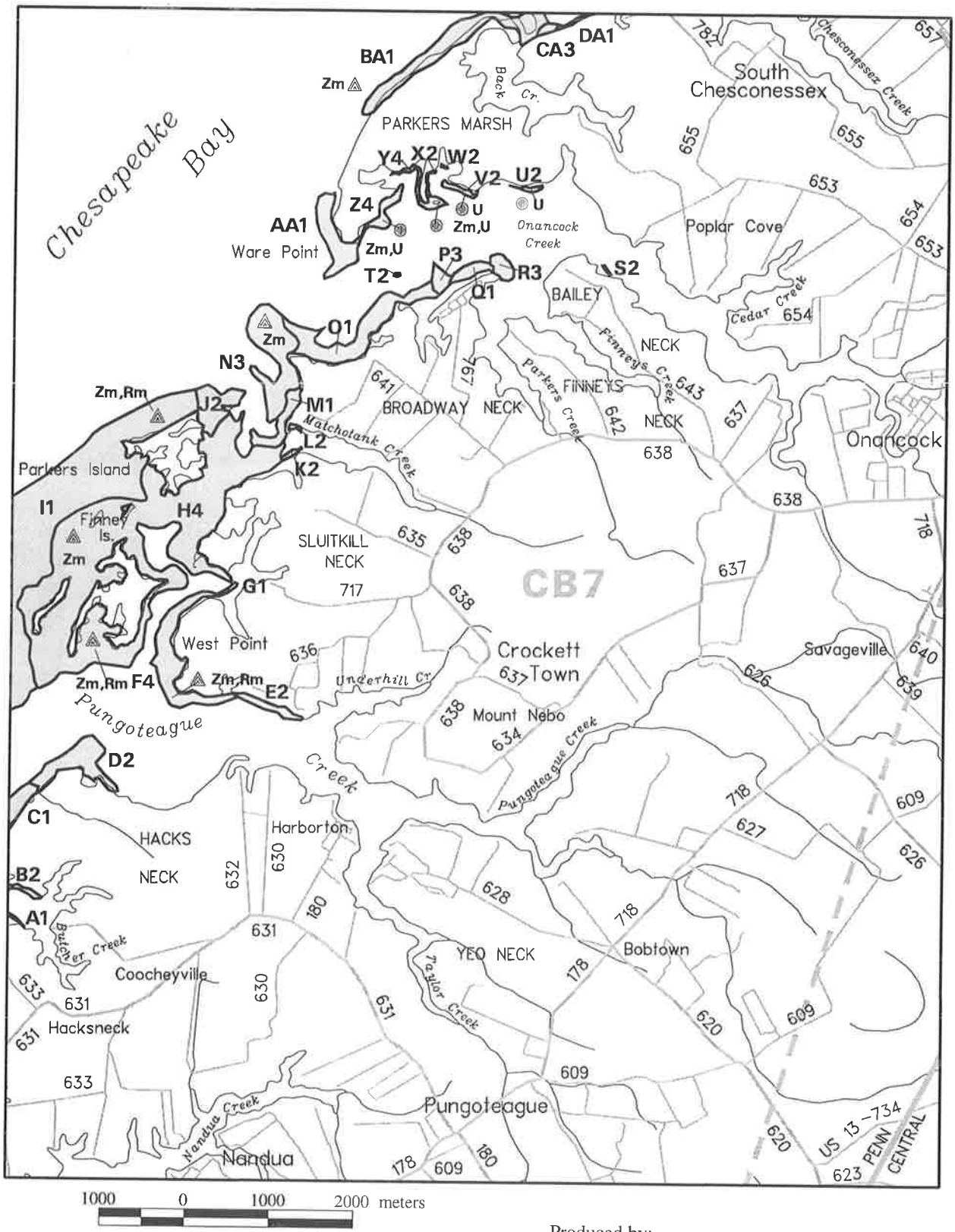
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(114) Pungoteague, Va.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
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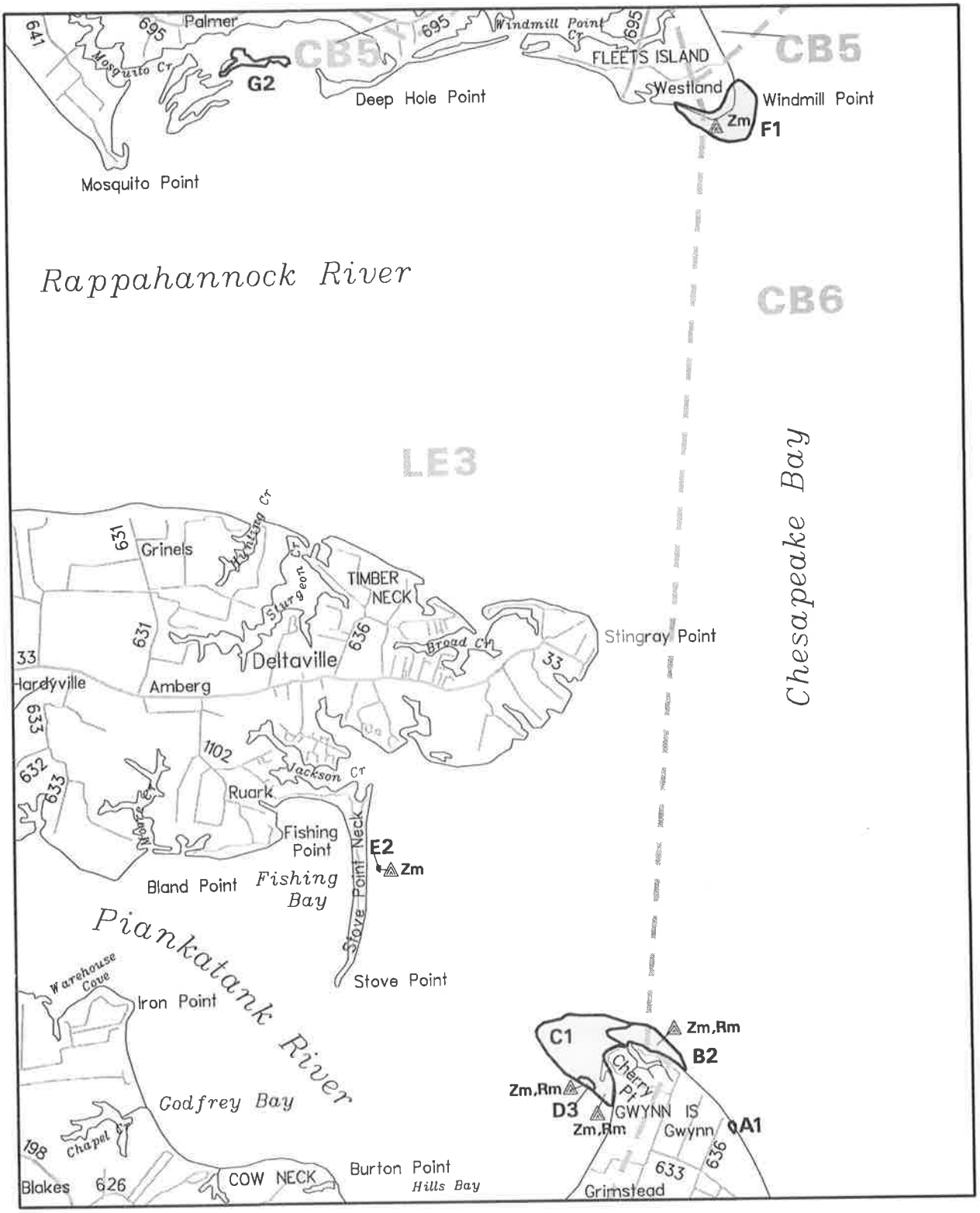
Submerged Aquatic Vegetation 1995

Deltaville, Va. (118)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/16/95

Produced by:
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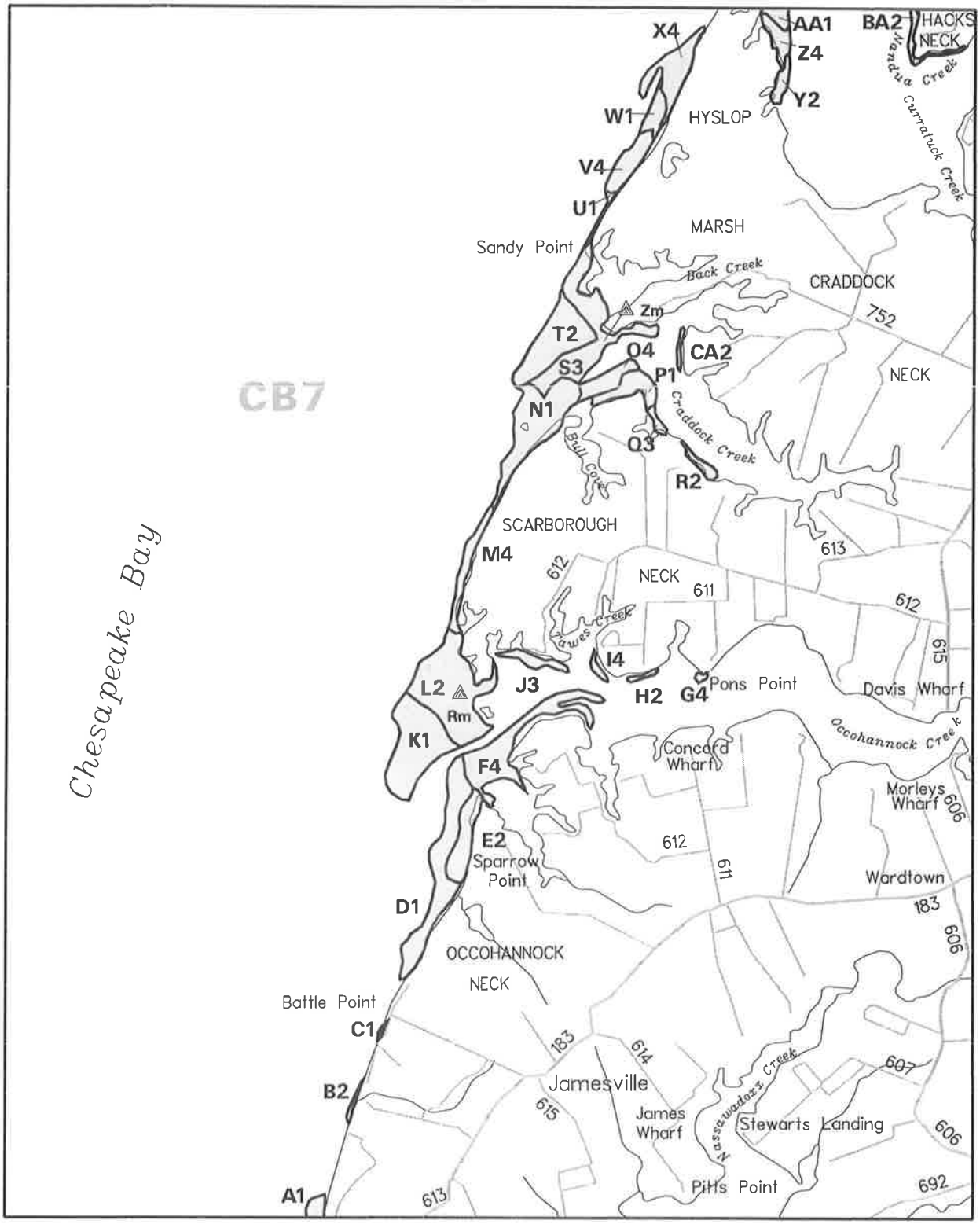
College of William and Mary

Submerged Aquatic Vegetation 1995

(119) Jamesville, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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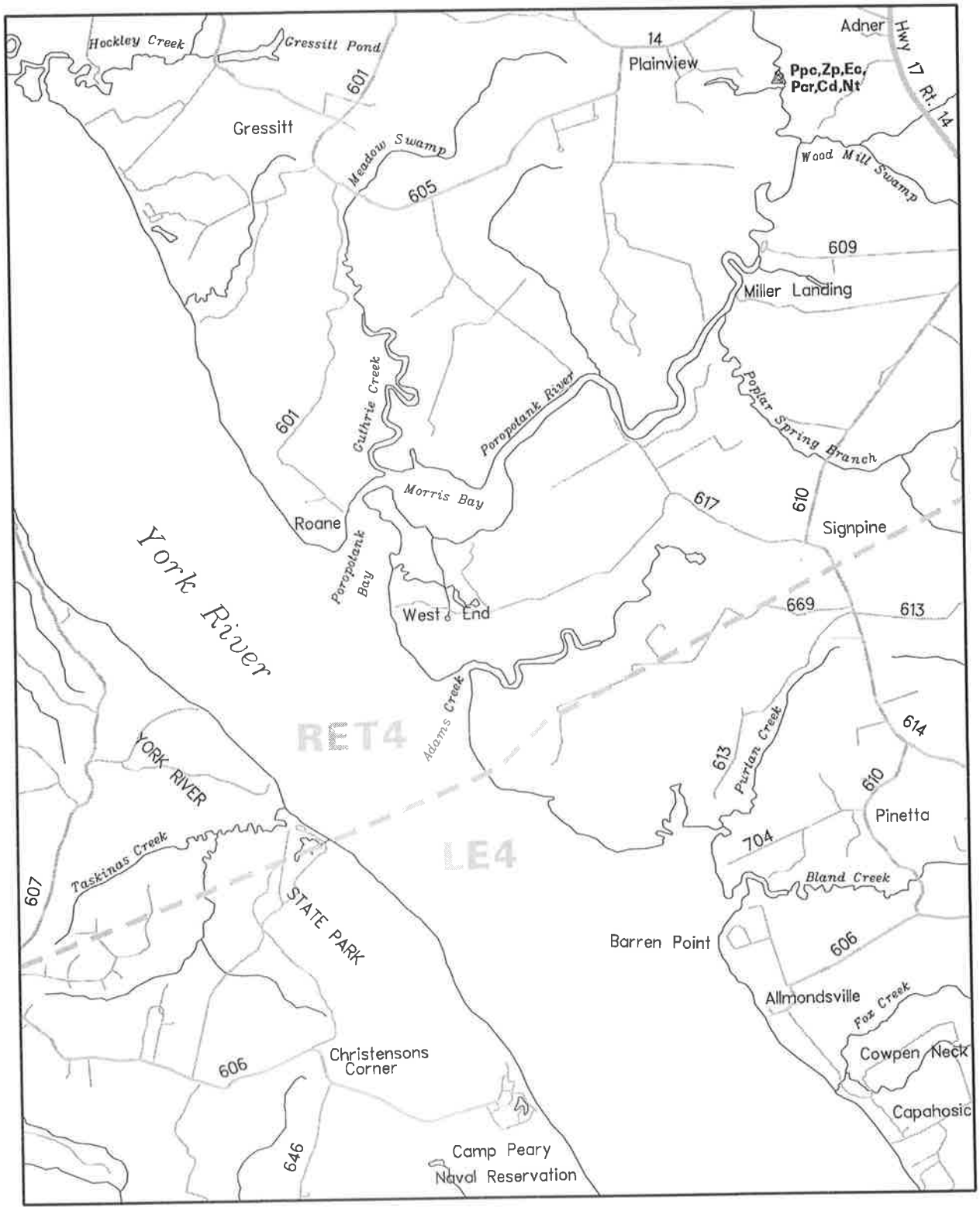
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Gressitt, Va. (121)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: Not Flown

Produced by:
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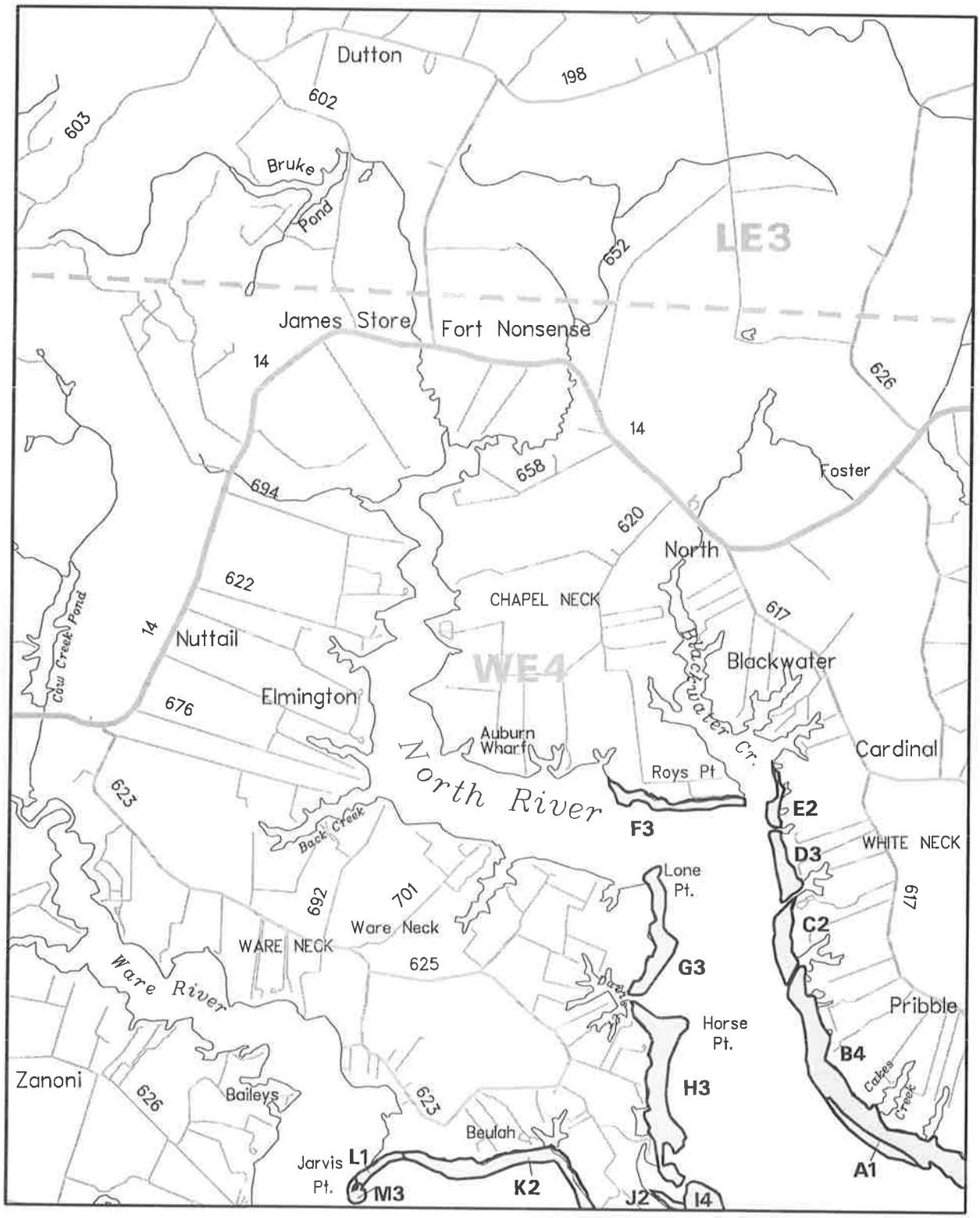
College of William and Mary

Submerged Aquatic Vegetation 1995

(122) Ware Neck, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/20/95

Produced by:
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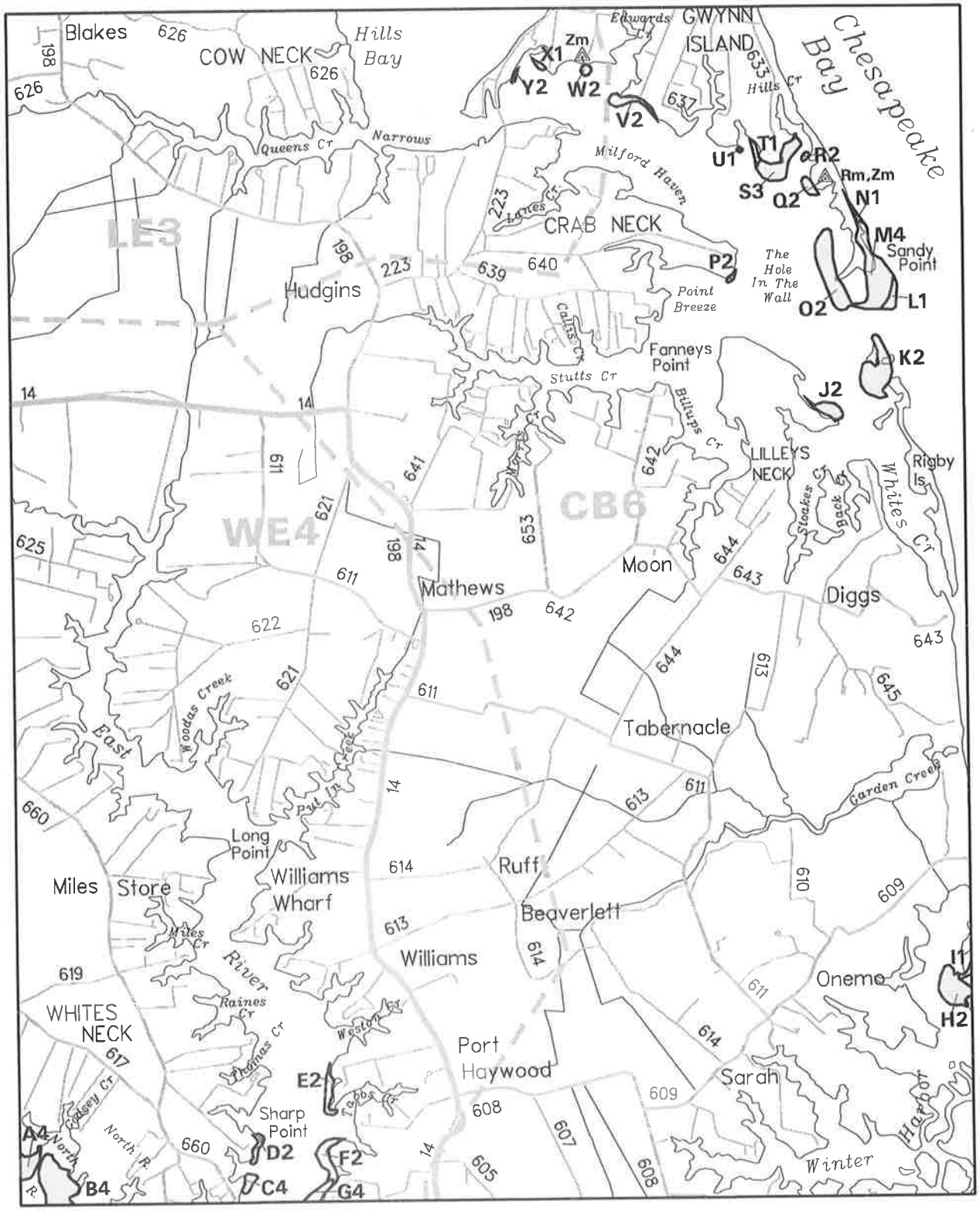
College of William and Mary

Submerged Aquatic Vegetation 1995

Mathews, Va. (123)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
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Virginia Institute of Marine Science
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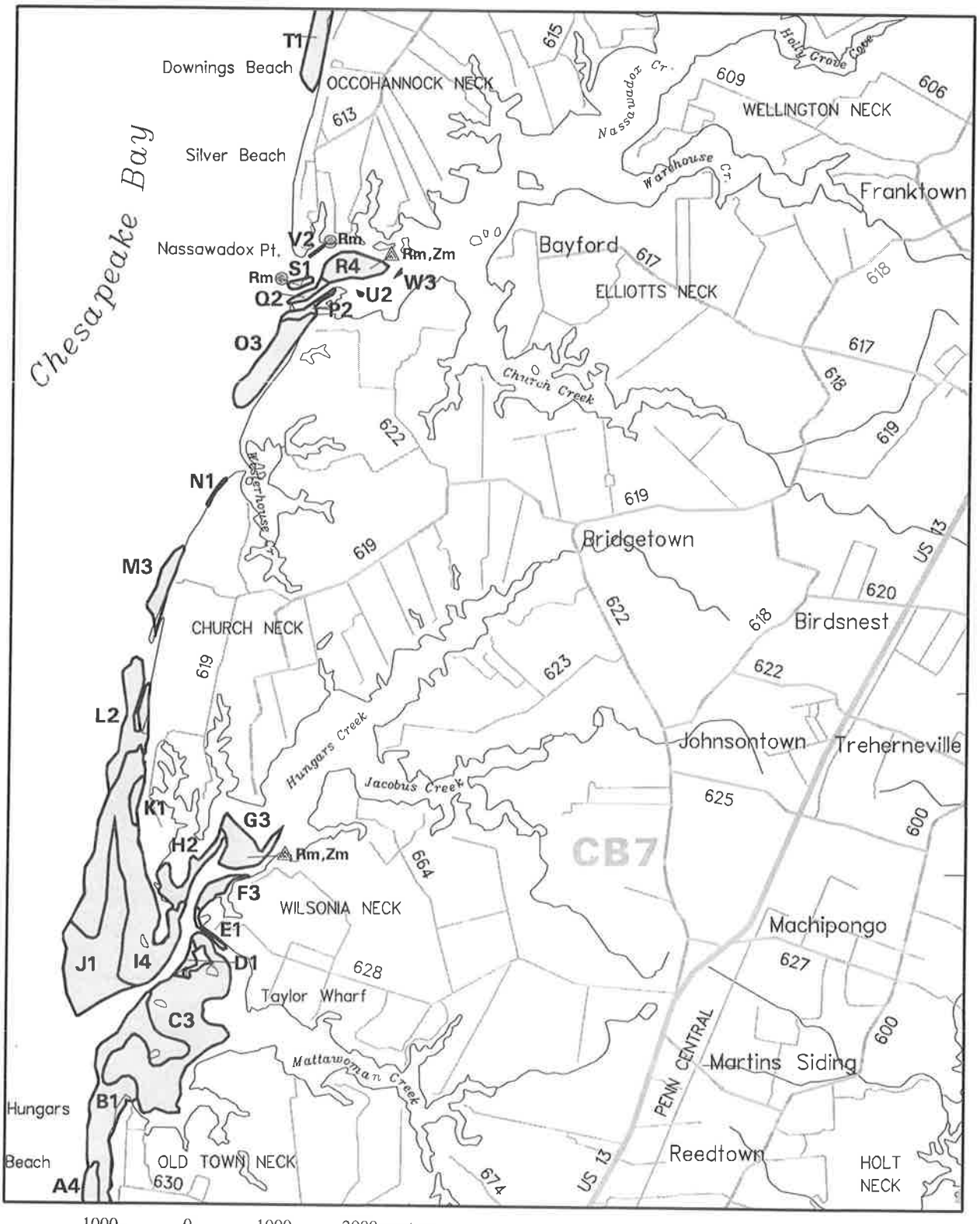
Submerged Aquatic Vegetation 1995

(124) Franktown, Va.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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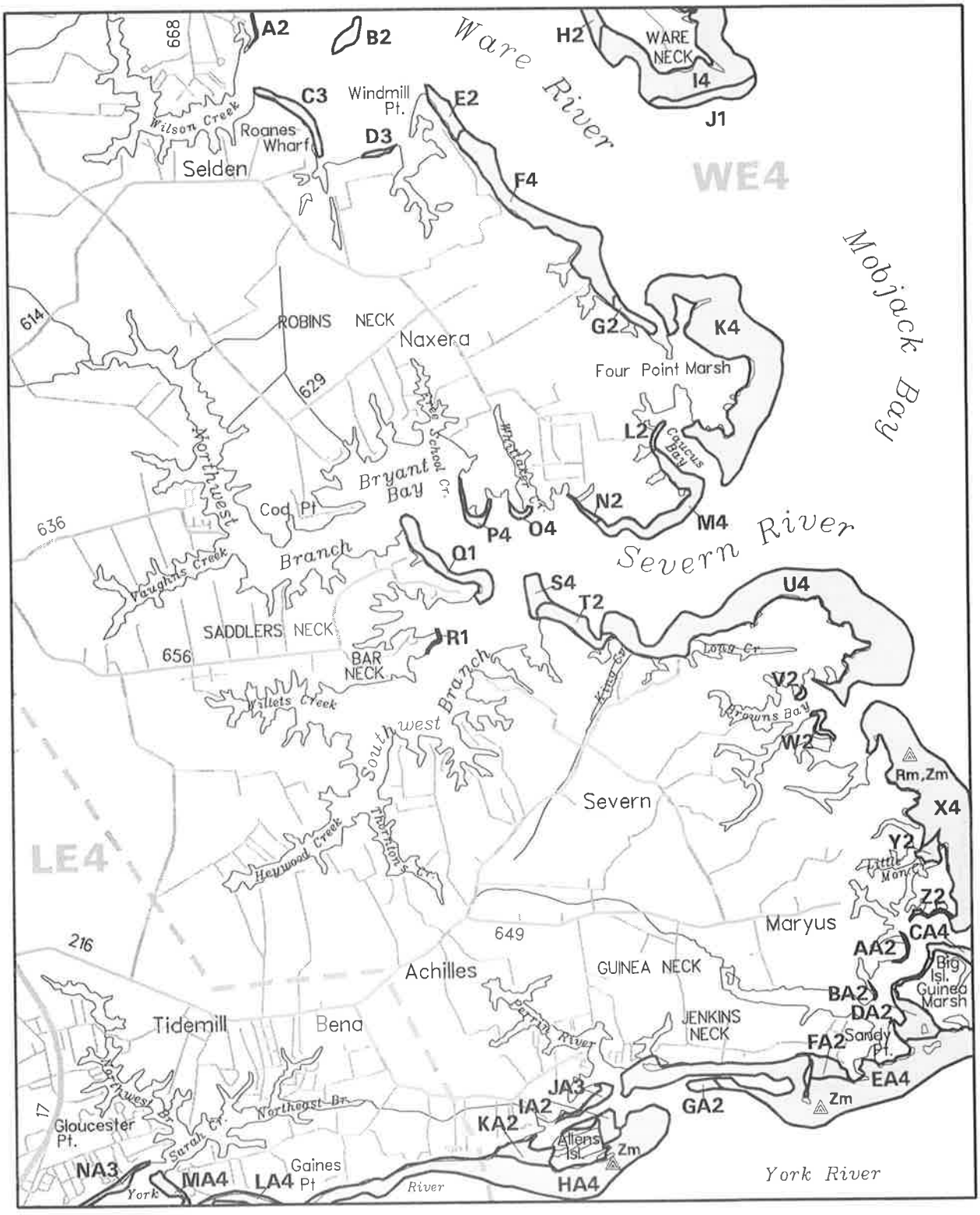
Submerged Aquatic Vegetation 1995

Achilles, Va. (131)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

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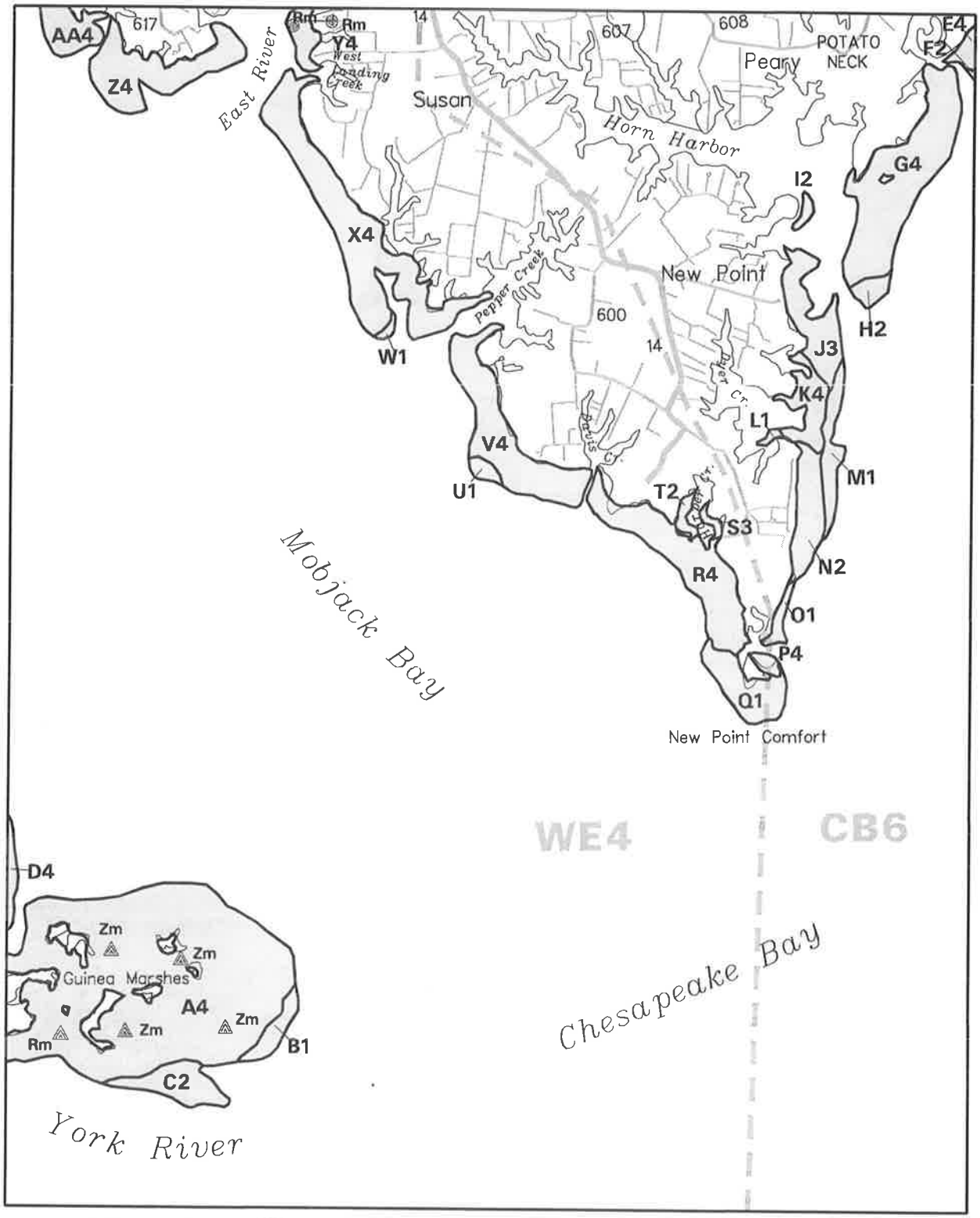
Submerged Aquatic Vegetation 1995

(132) New Point Comfort, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/20/95

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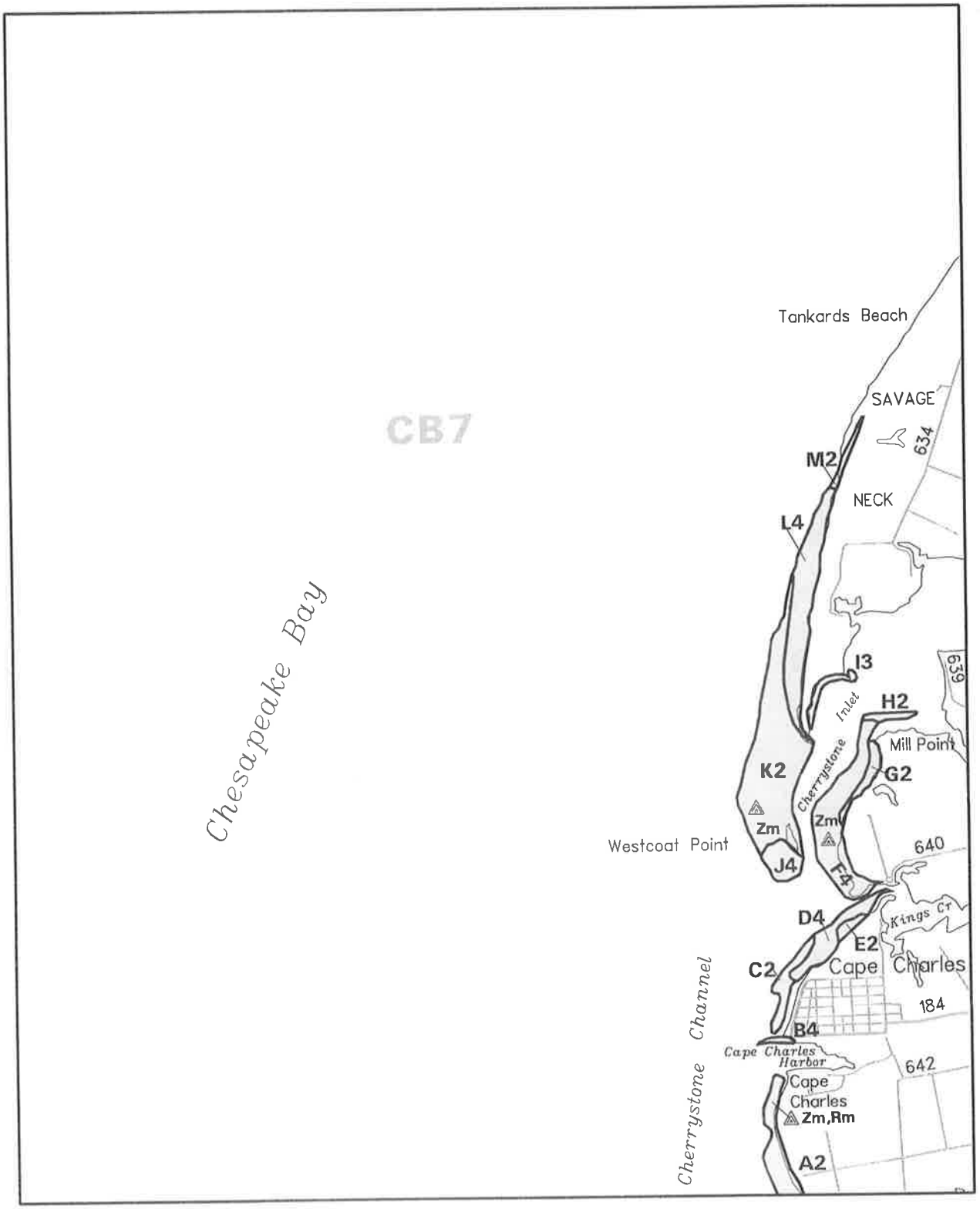
Submerged Aquatic Vegetation 1995

Cape Charles, Va. (133)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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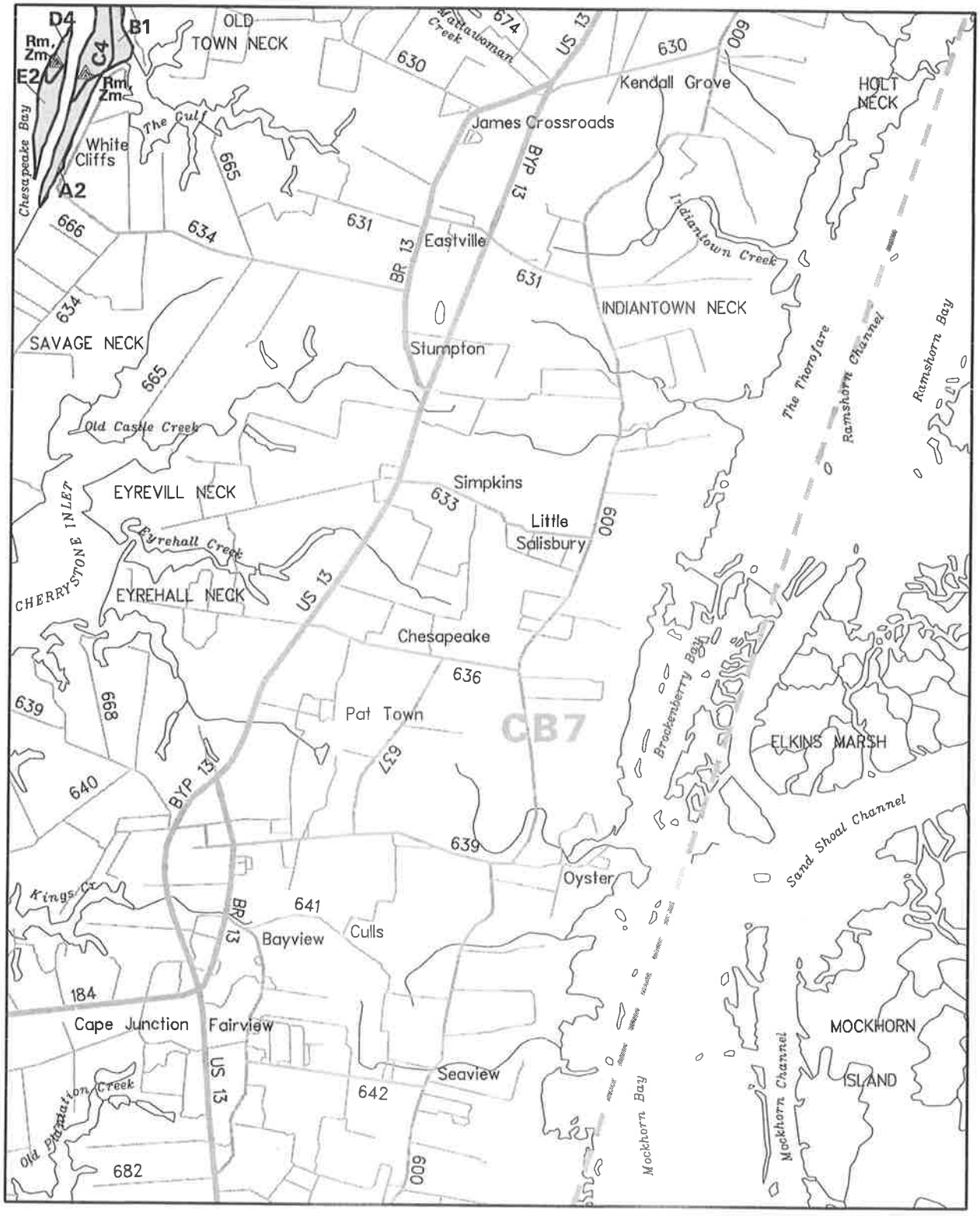
College of William and Mary

Submerged Aquatic Vegetation 1995

(134) Cheriton, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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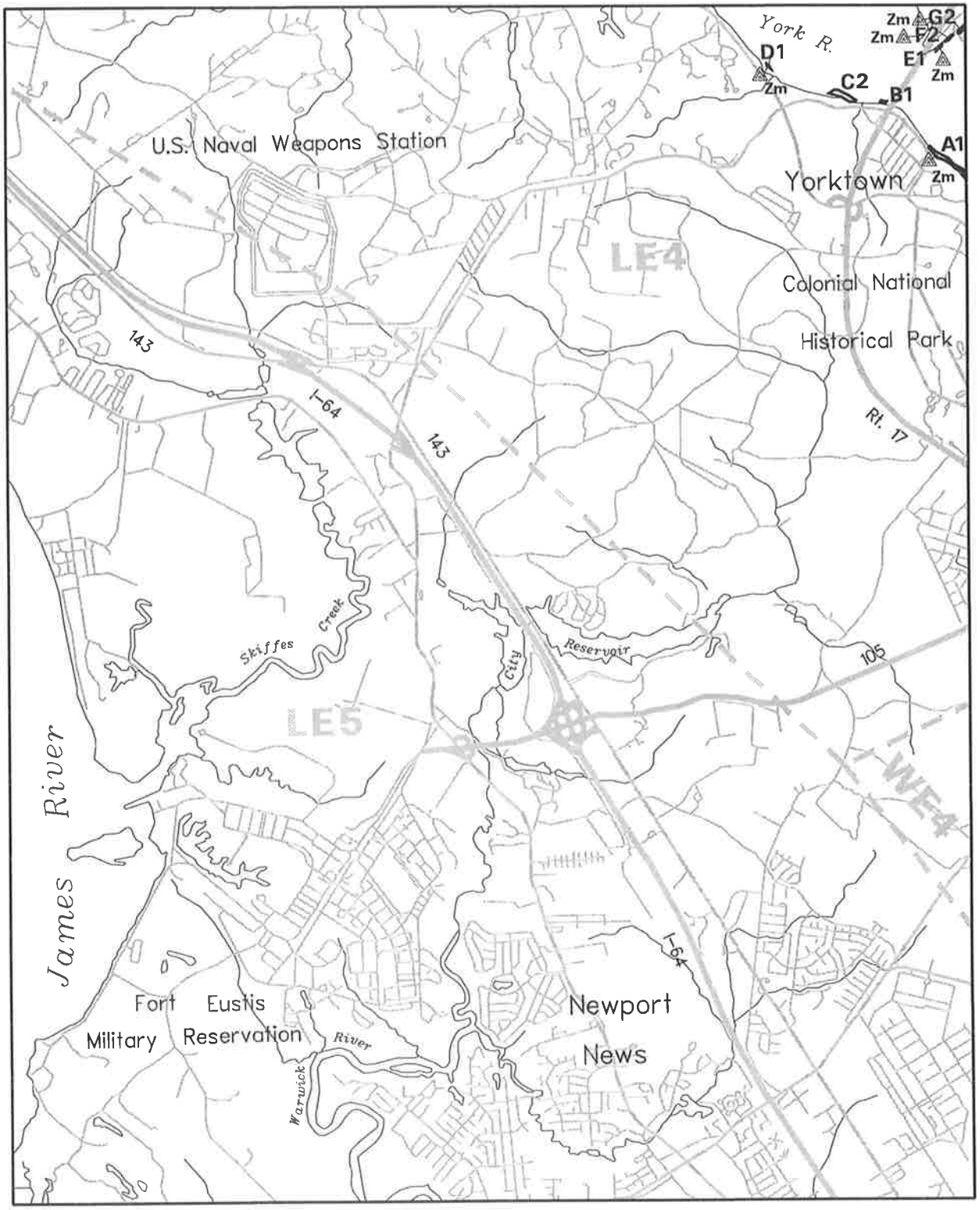
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Yorktown, Va. (139)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

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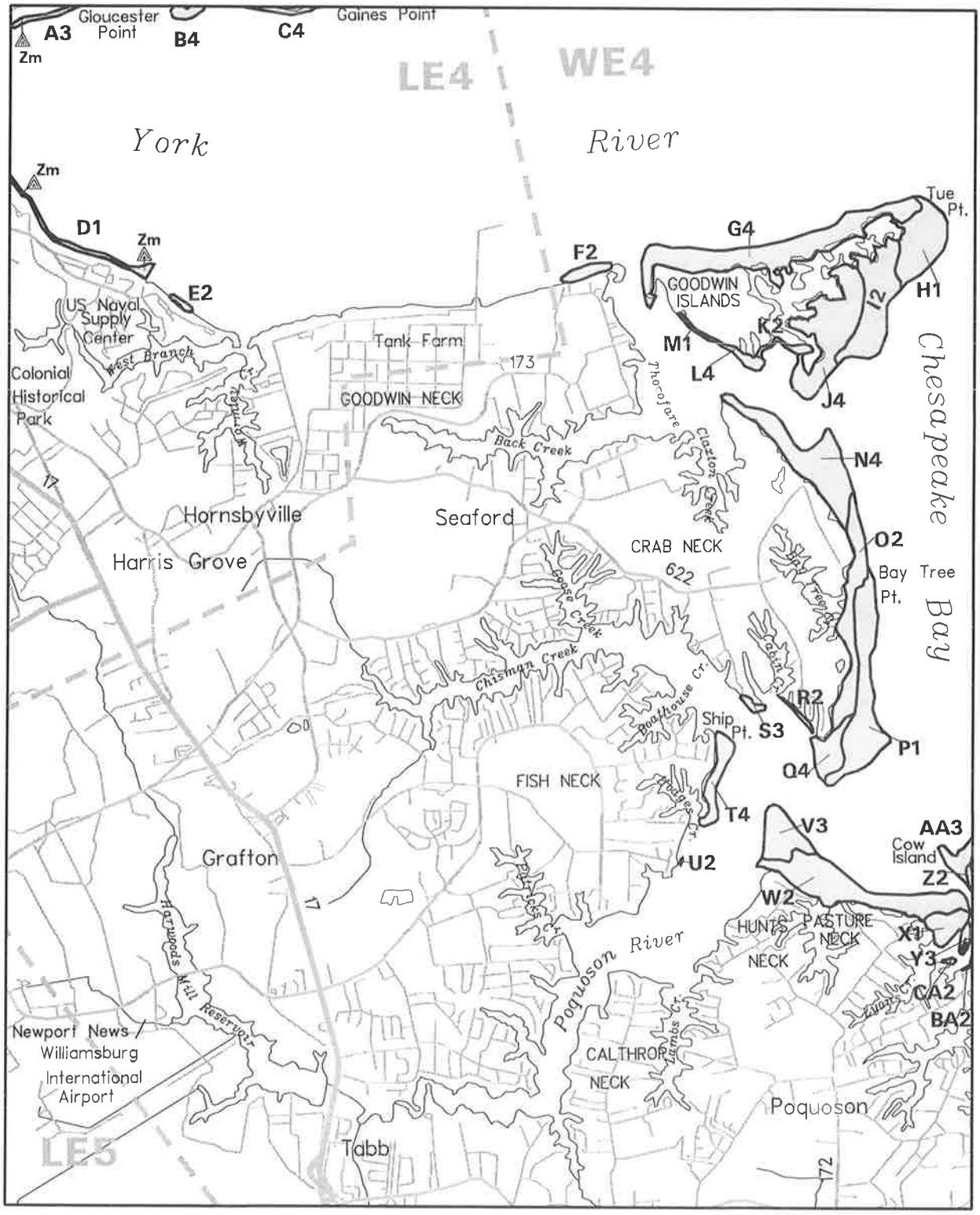
Submerged Aquatic Vegetation 1995

(140) Poquoson West, Va.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/20/95

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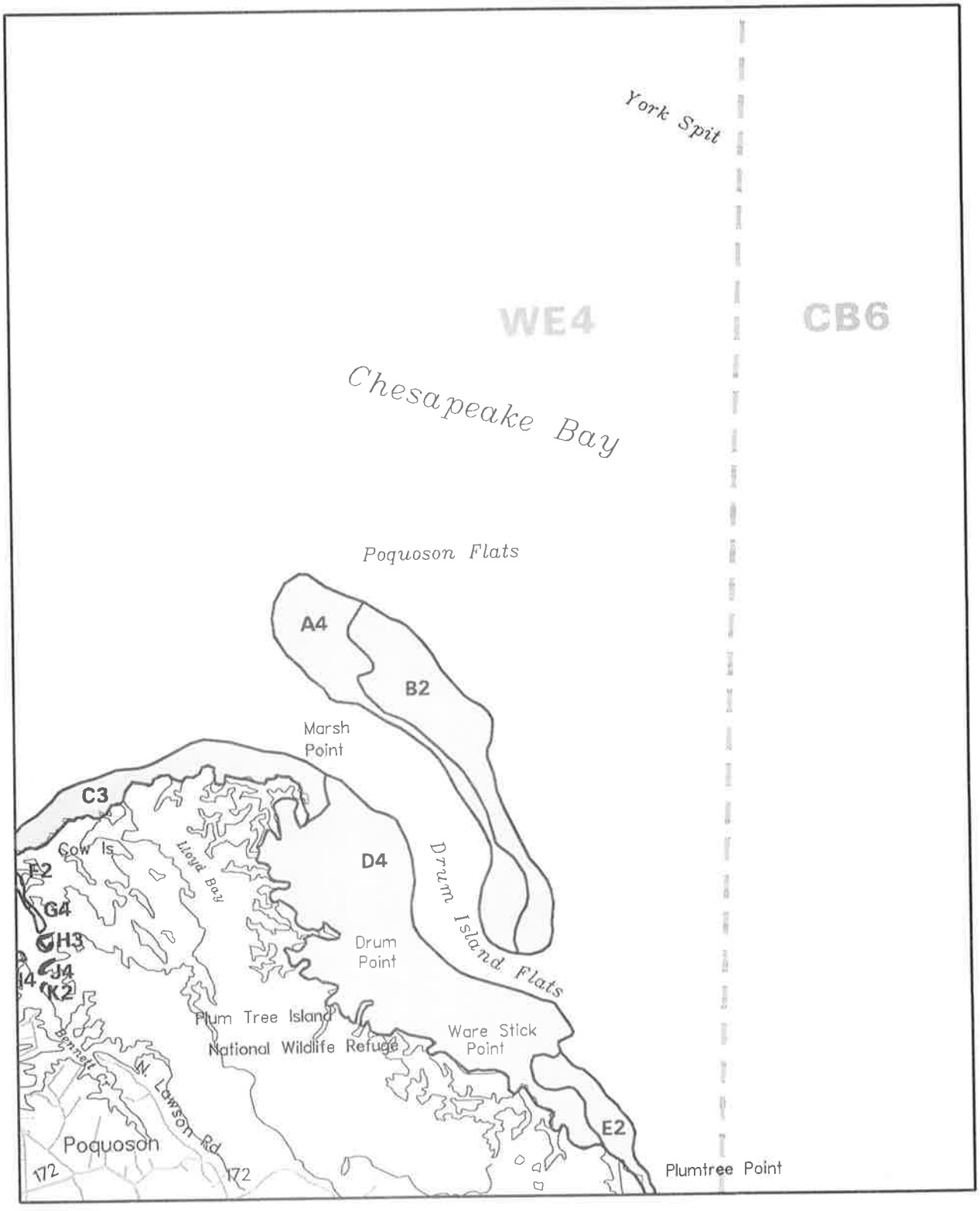
College of William and Mary

Submerged Aquatic Vegetation 1995

Poquoson East, Va. (141)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
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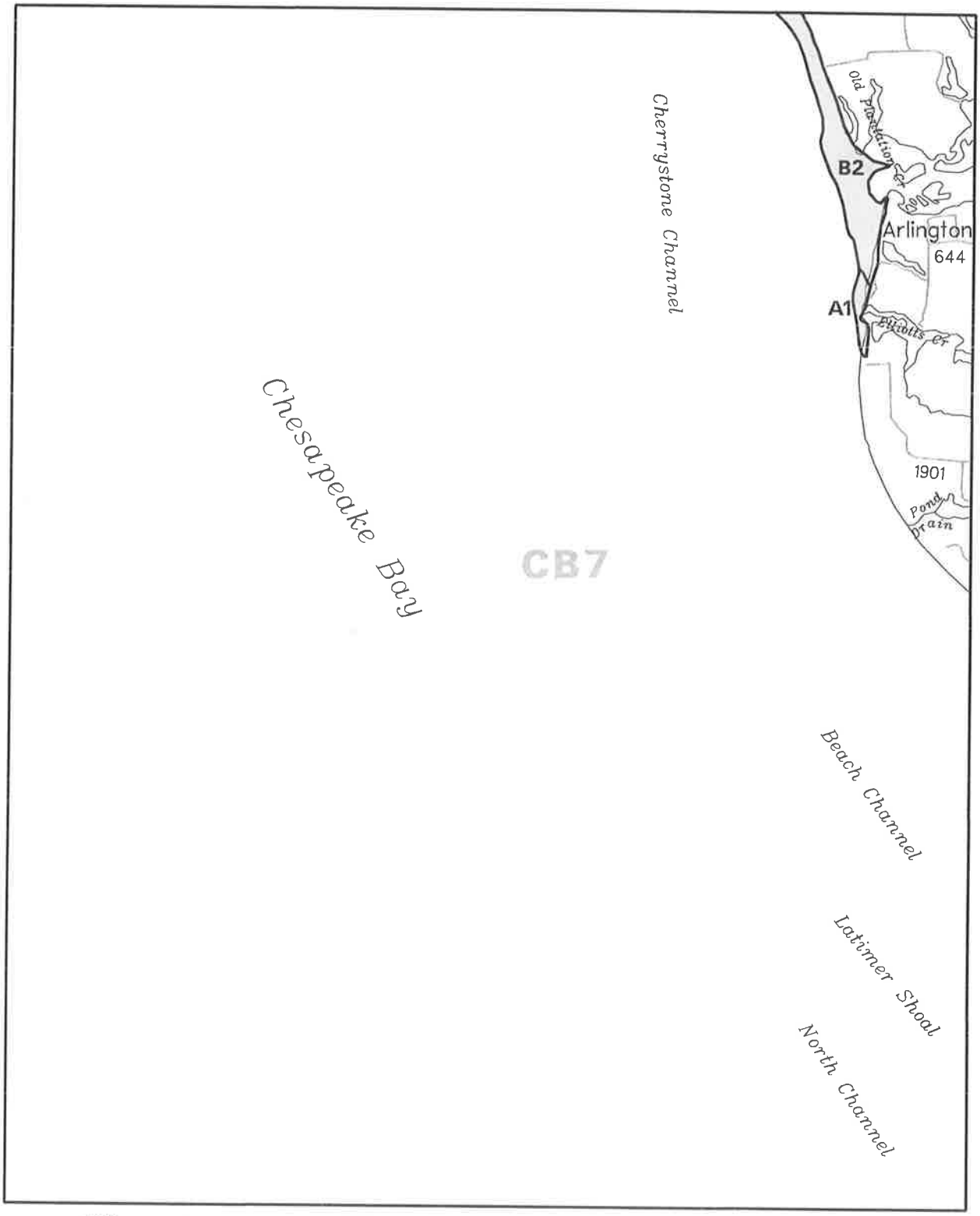
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(142) Elliotts Creek, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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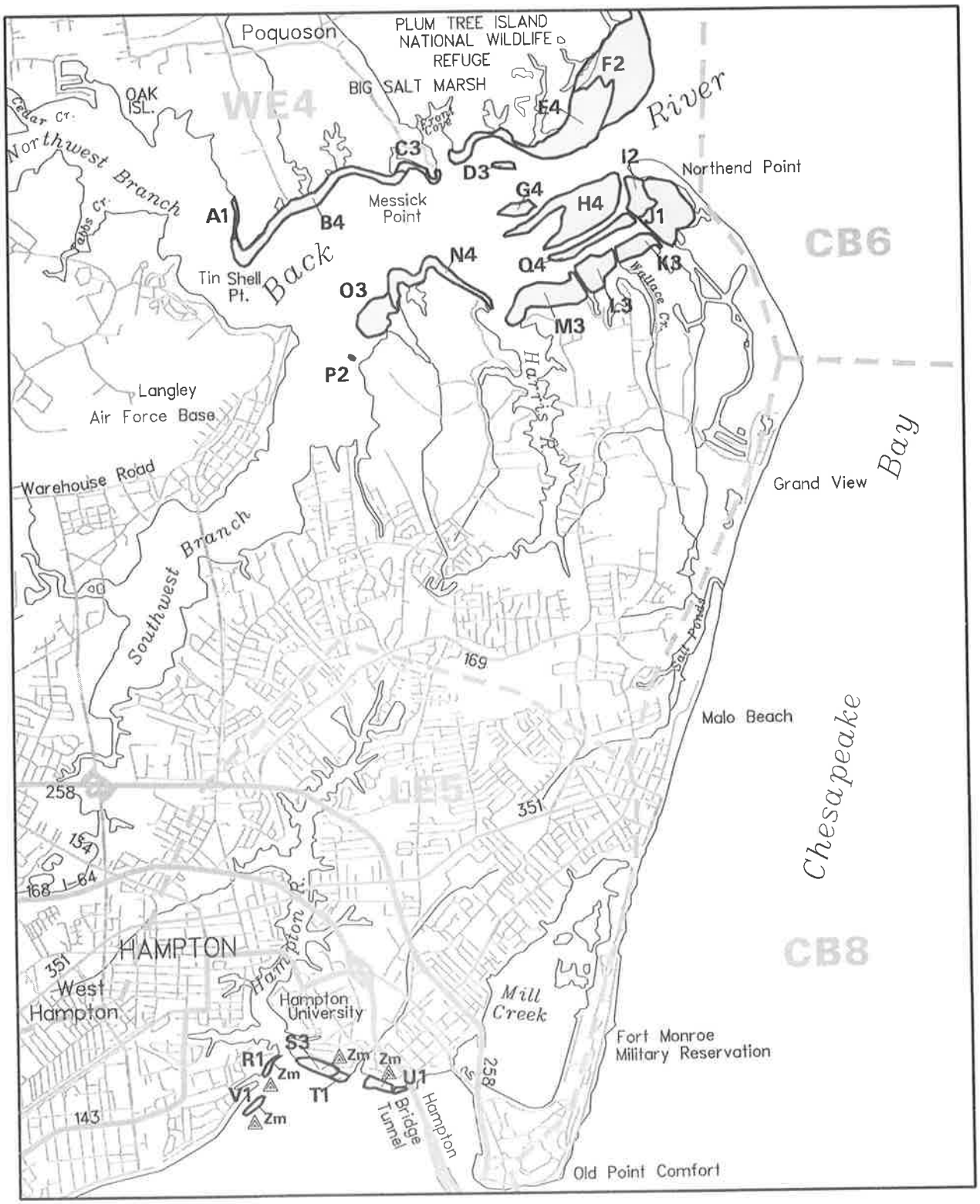
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Hampton, Va. (147)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
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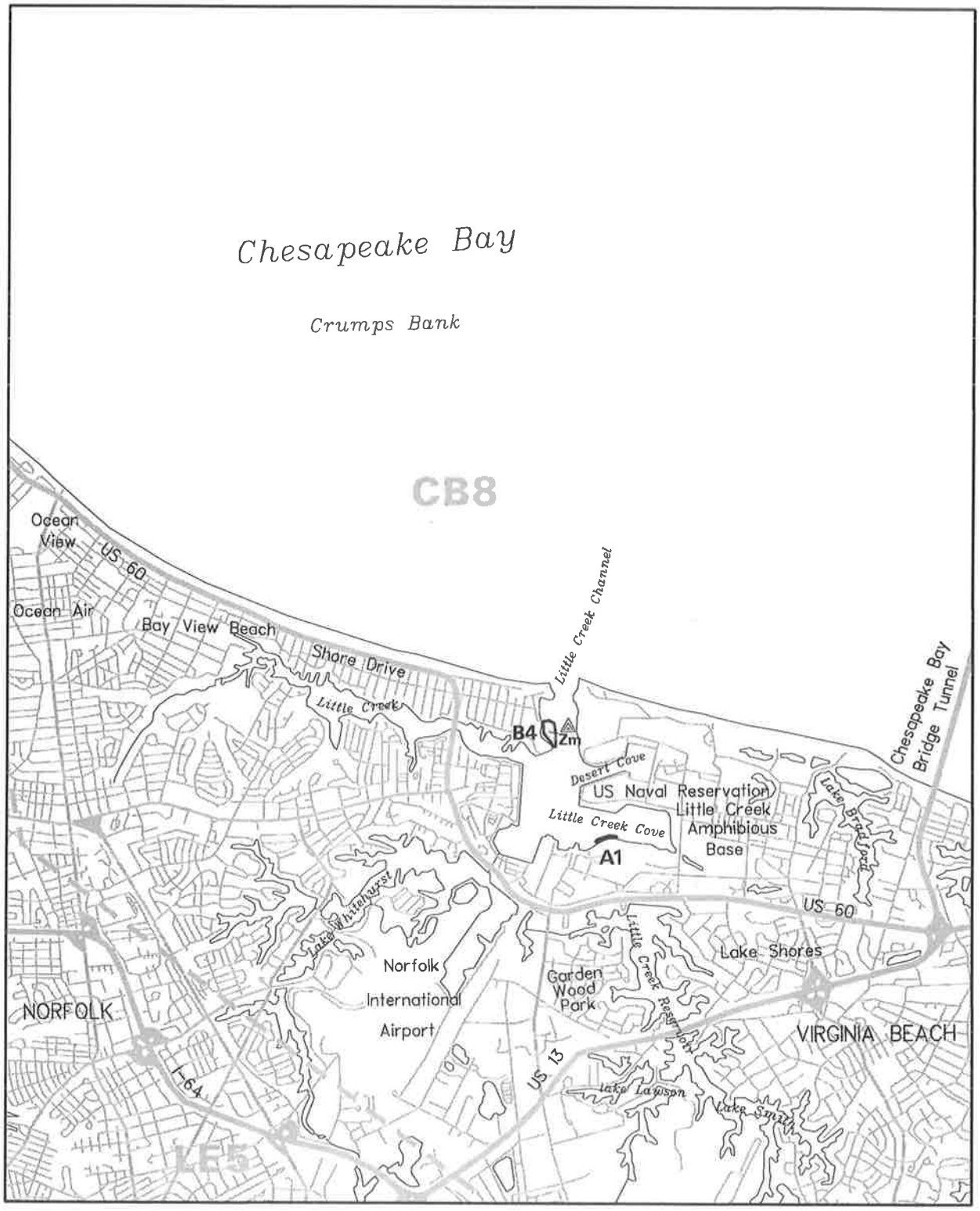
College of William and Mary

Submerged Aquatic Vegetation 1995

(151) Little Creek, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
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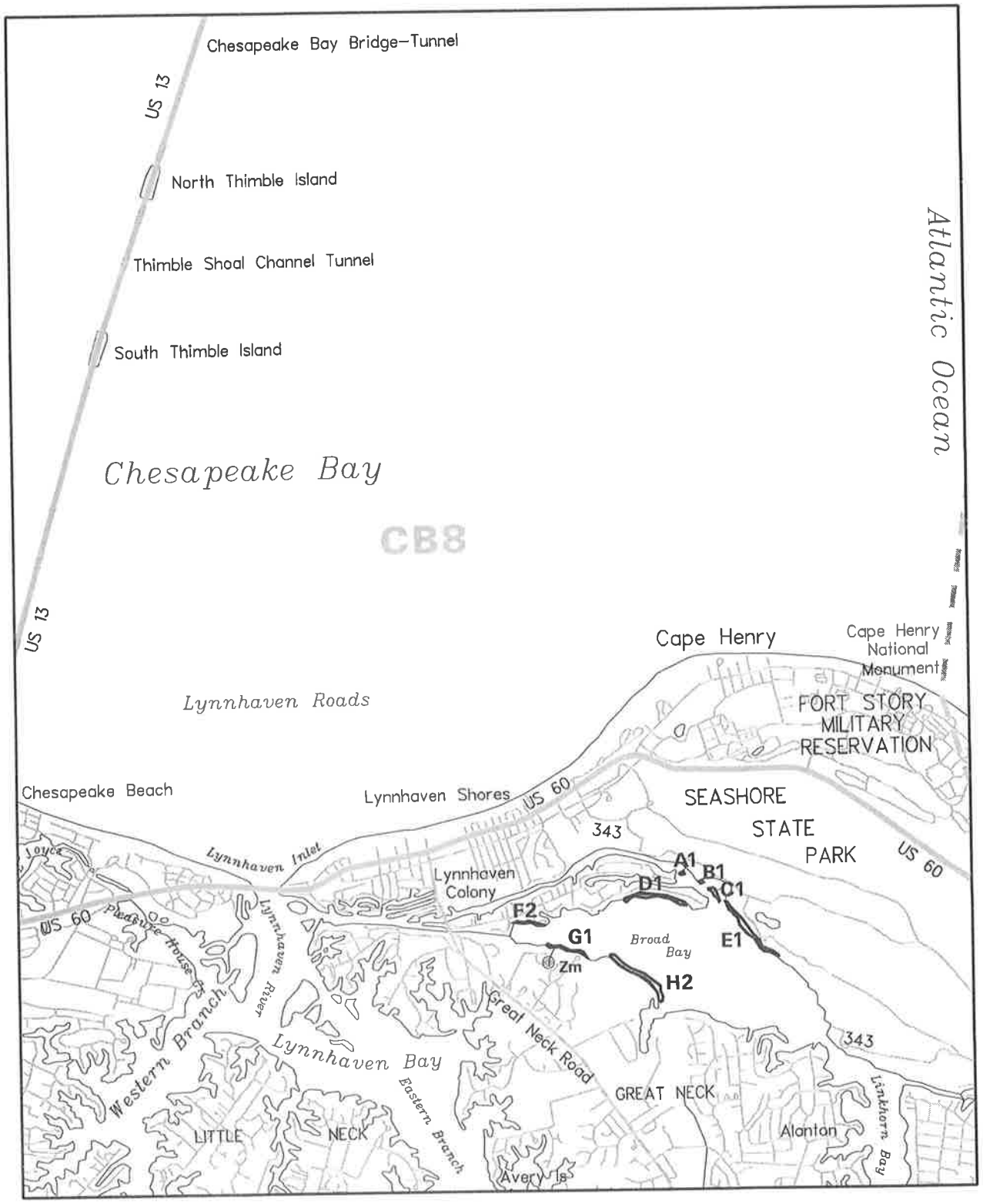
College of William and Mary

Submerged Aquatic Vegetation 1995

Cape Henry, Va. (152)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
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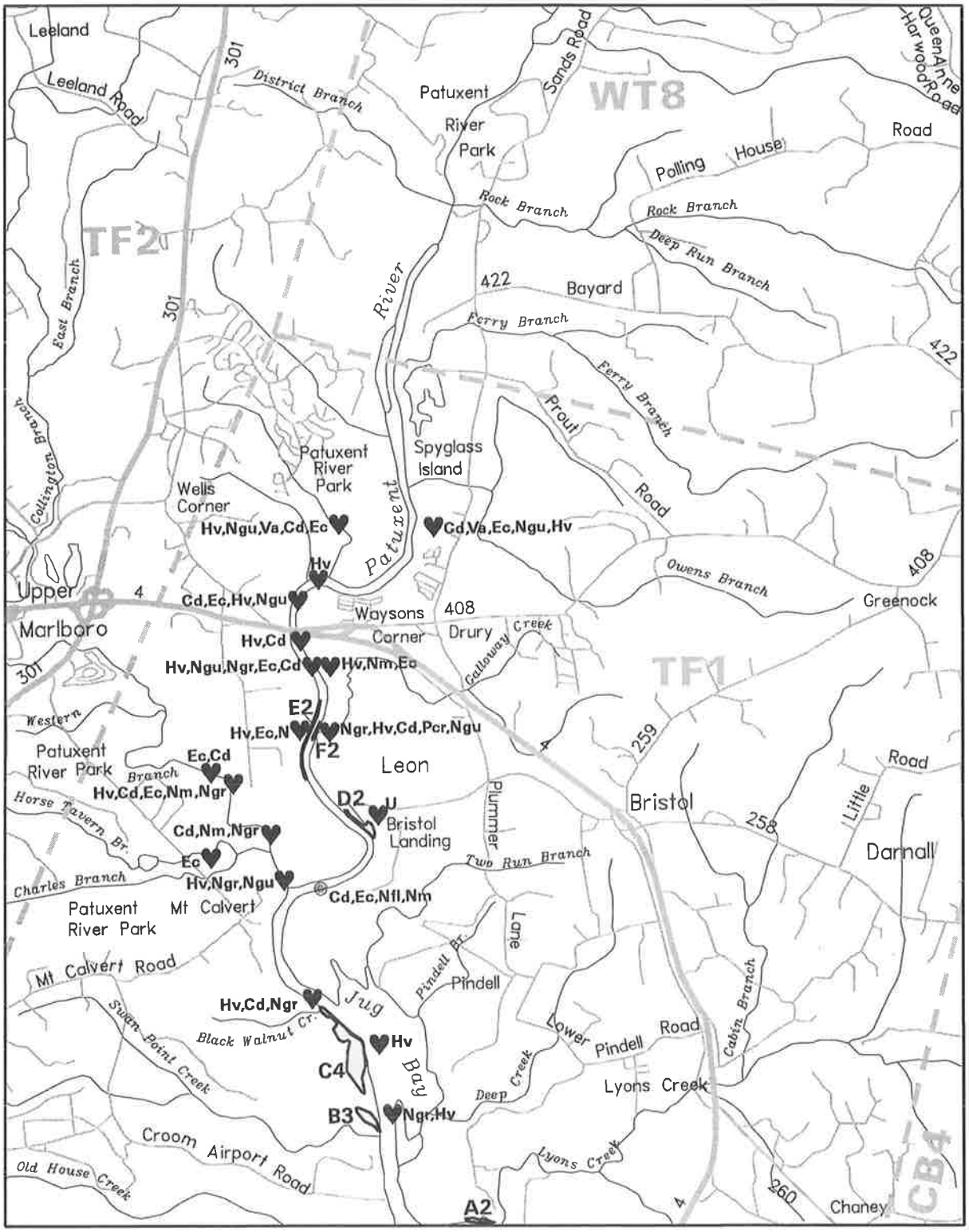
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(159) Bristol, Md.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 08/12/95

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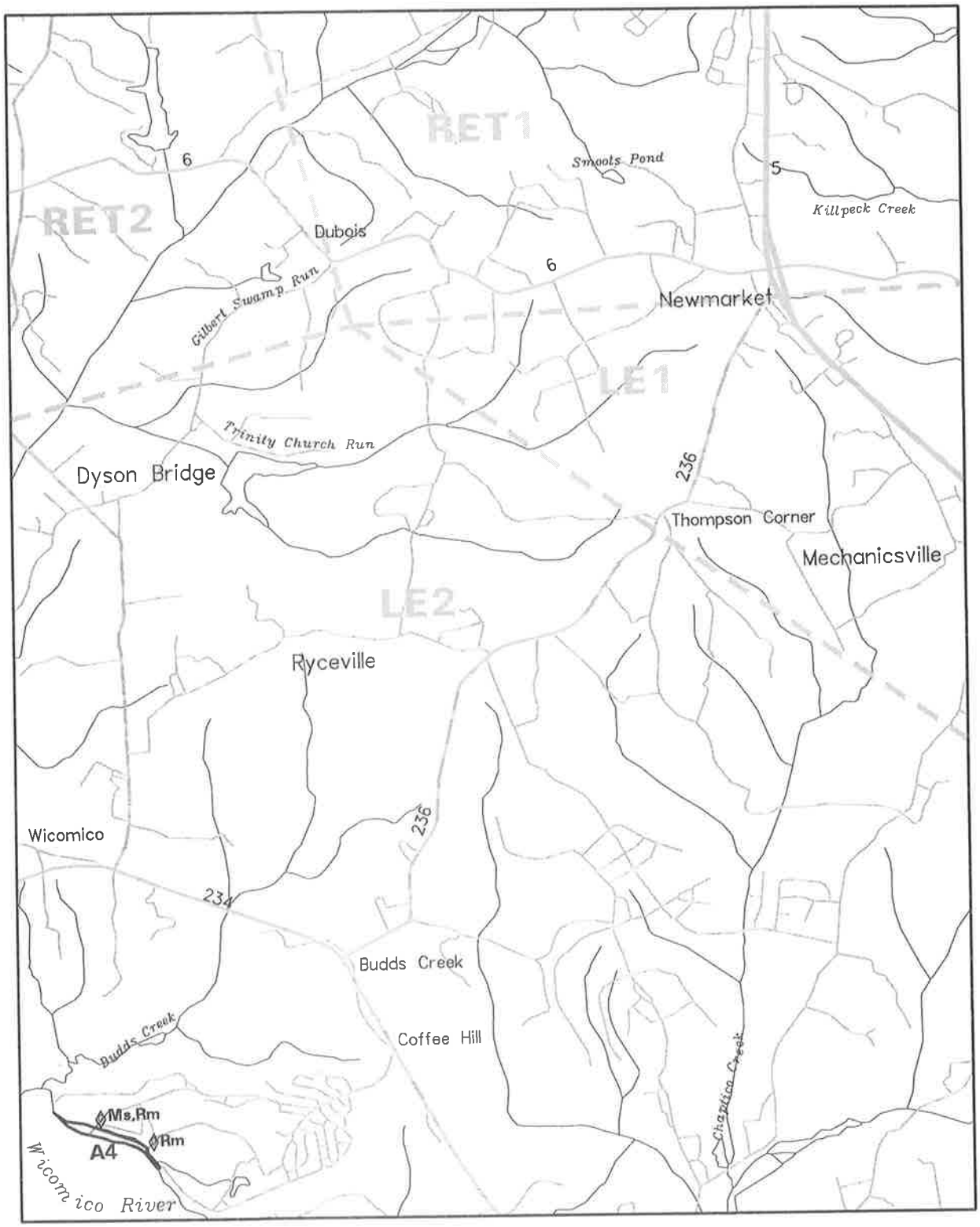
College of William and Mary

Submerged Aquatic Vegetation 1995

Charlotte Hall, Md. (162)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 07/24/95

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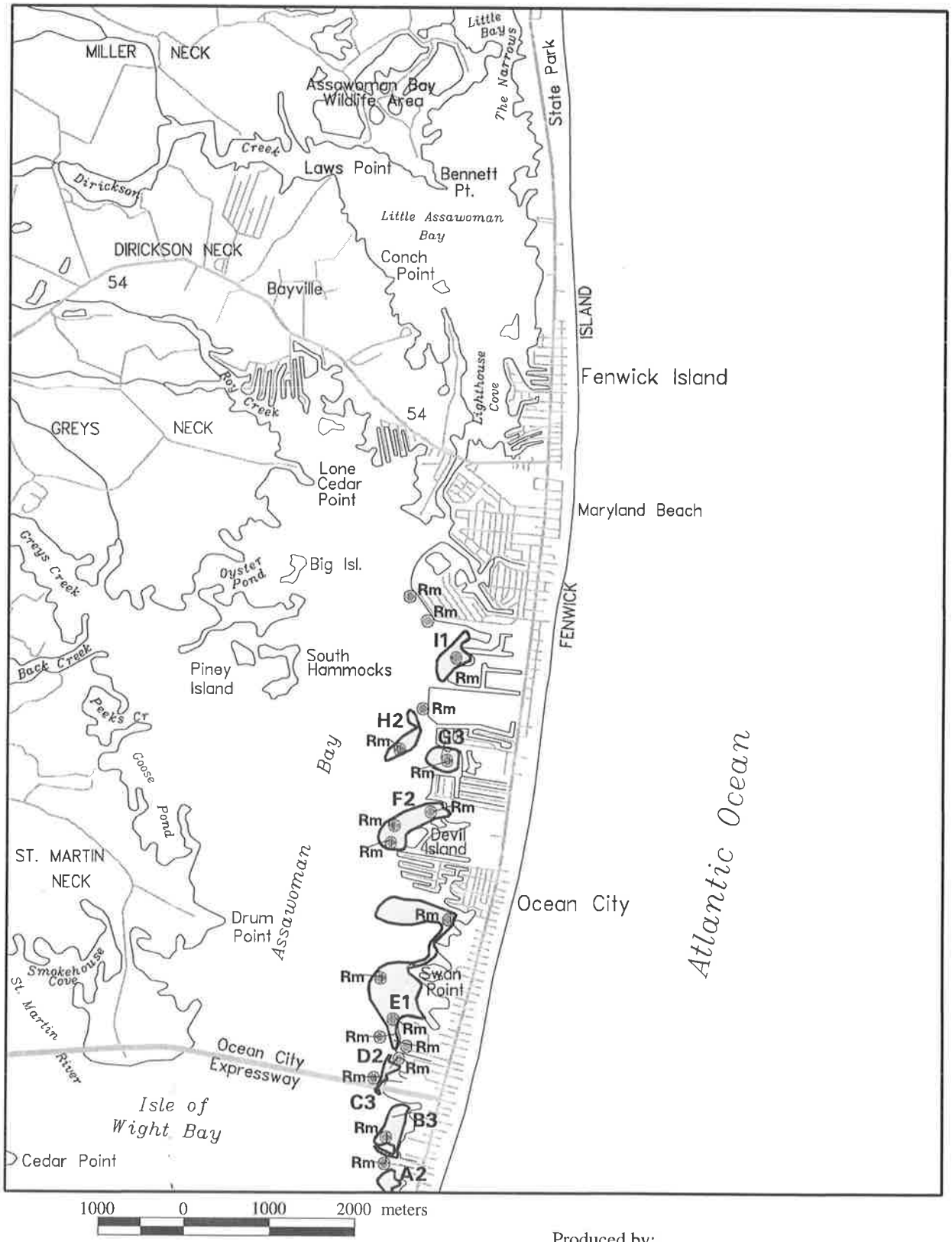
Submerged Aquatic Vegetation 1995

(166) Assawoman Bay, Md.–Del.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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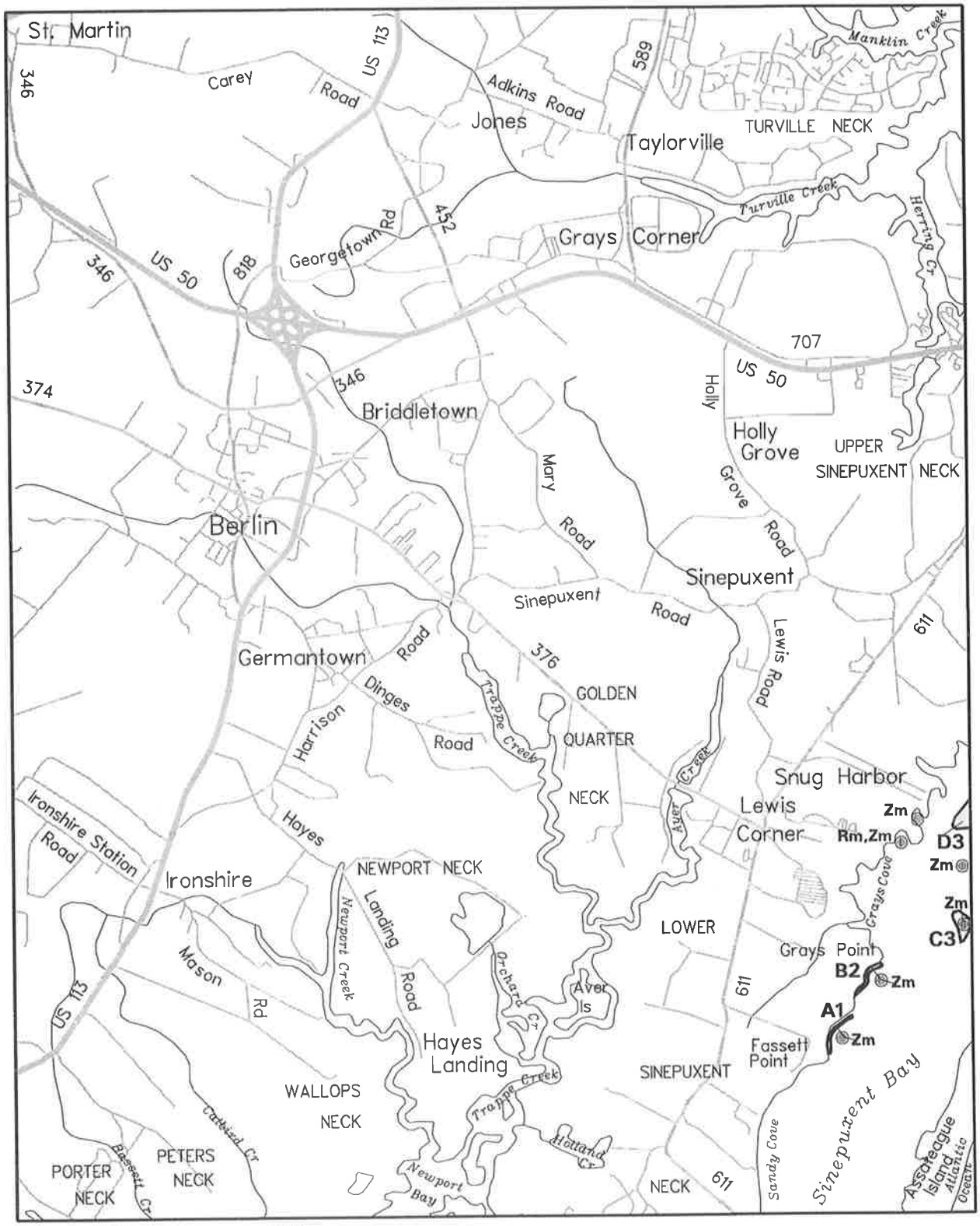
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Berlin, Md. (167)



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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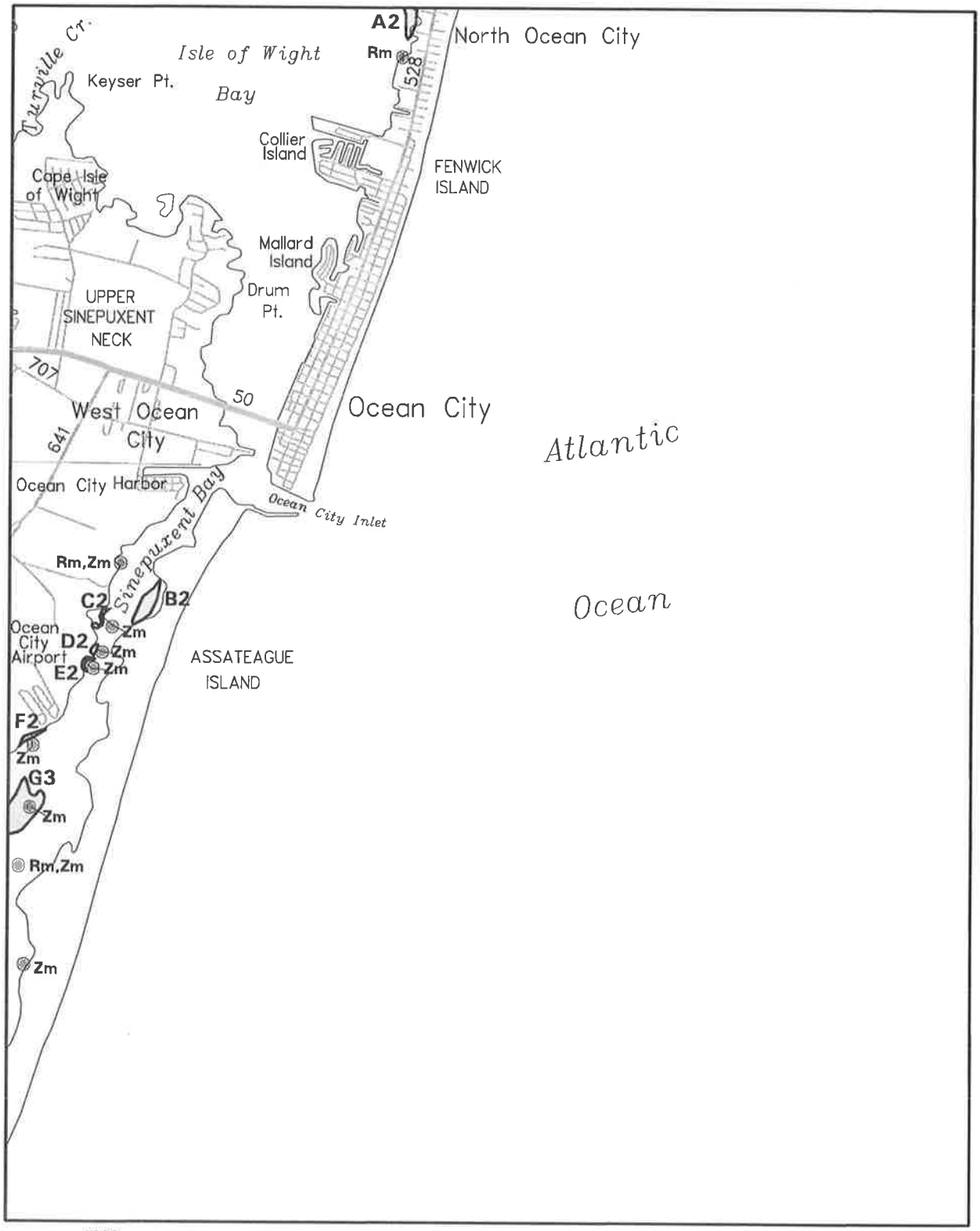
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(168) Ocean City, Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

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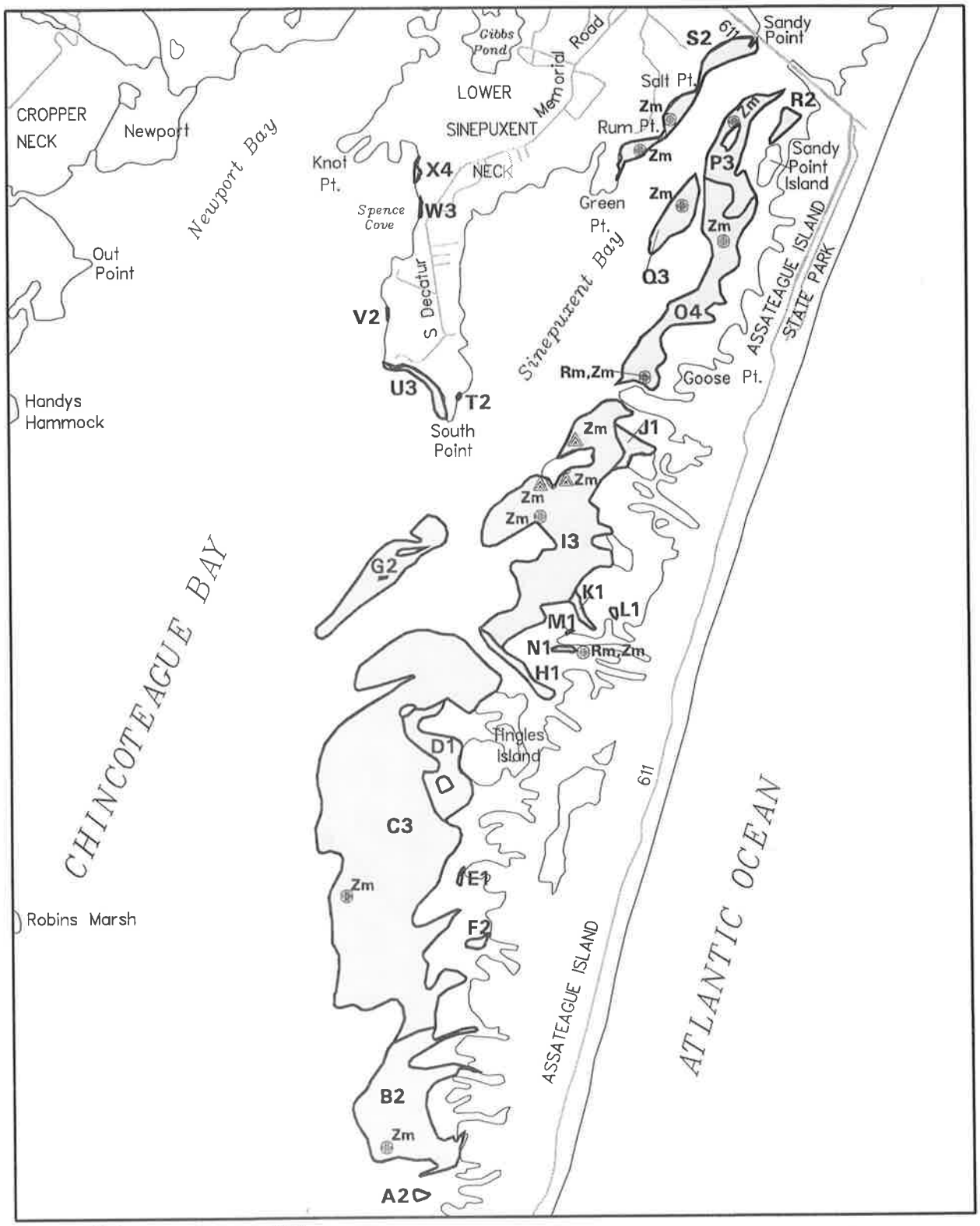
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Tingles Island, Md. (170)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/96

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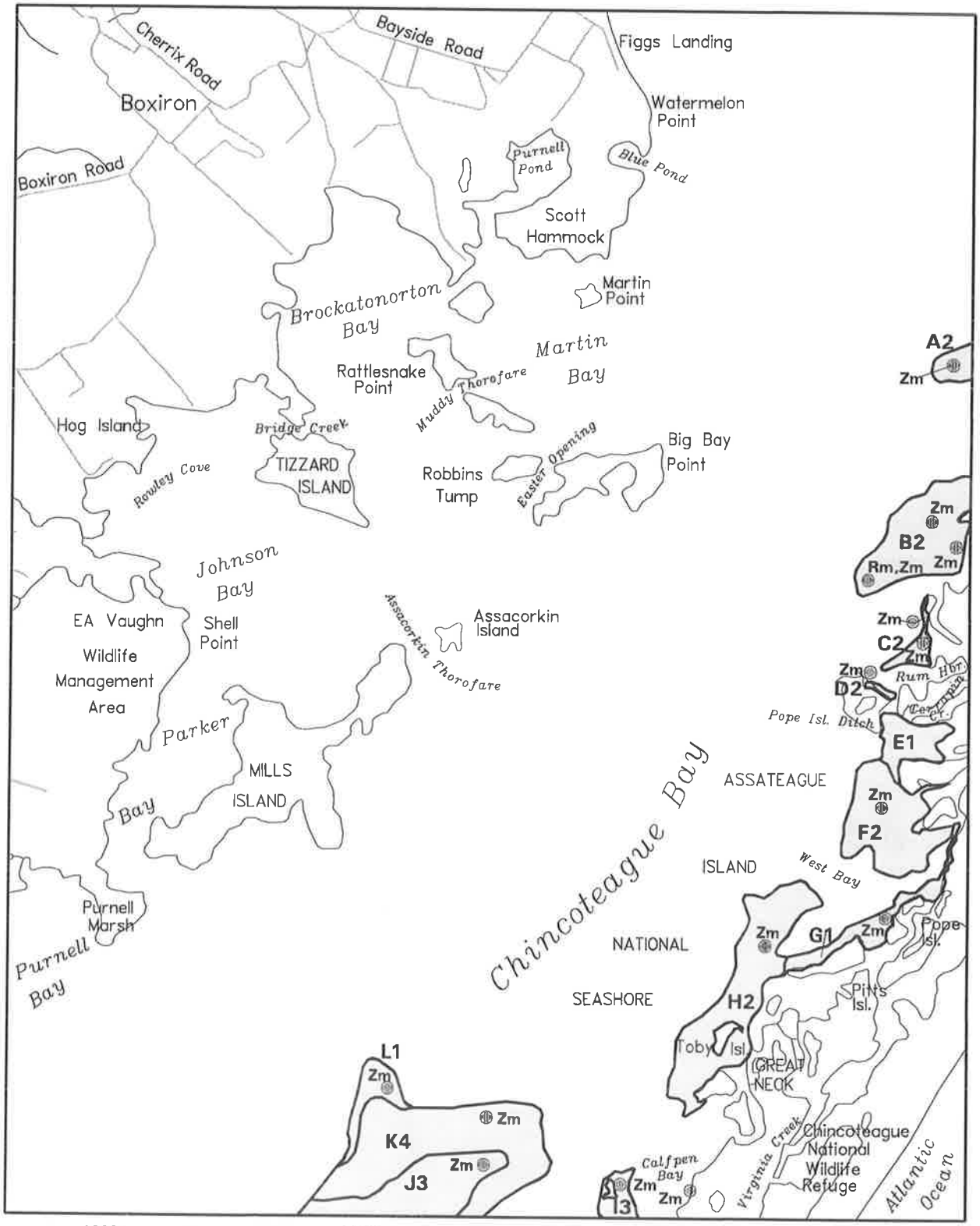
Submerged Aquatic Vegetation 1995

(172) Boxiron, Md.–Va.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
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Virginia Institute of Marine Science
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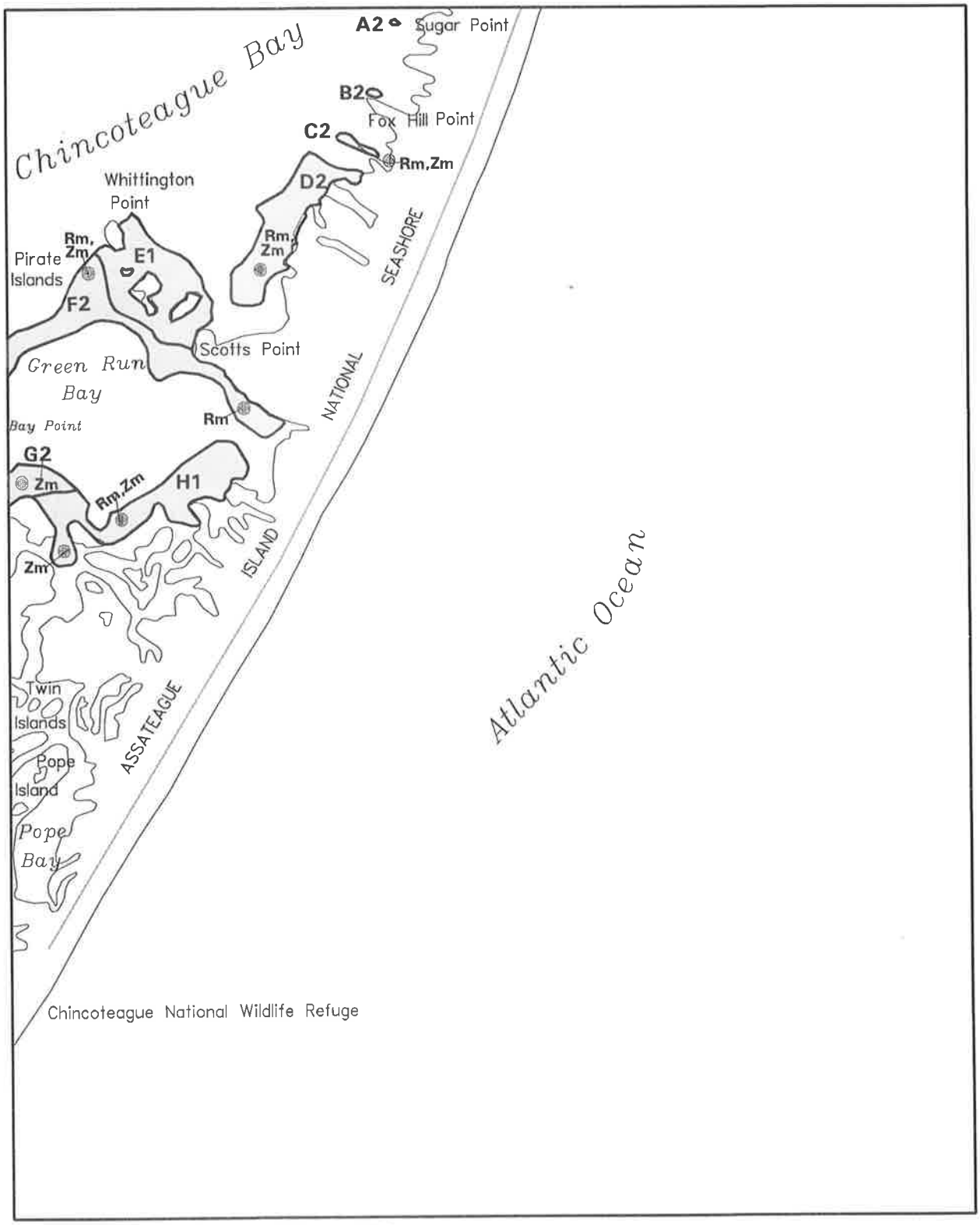
Submerged Aquatic Vegetation 1995

Whittington Point, Md.–Va. (173)



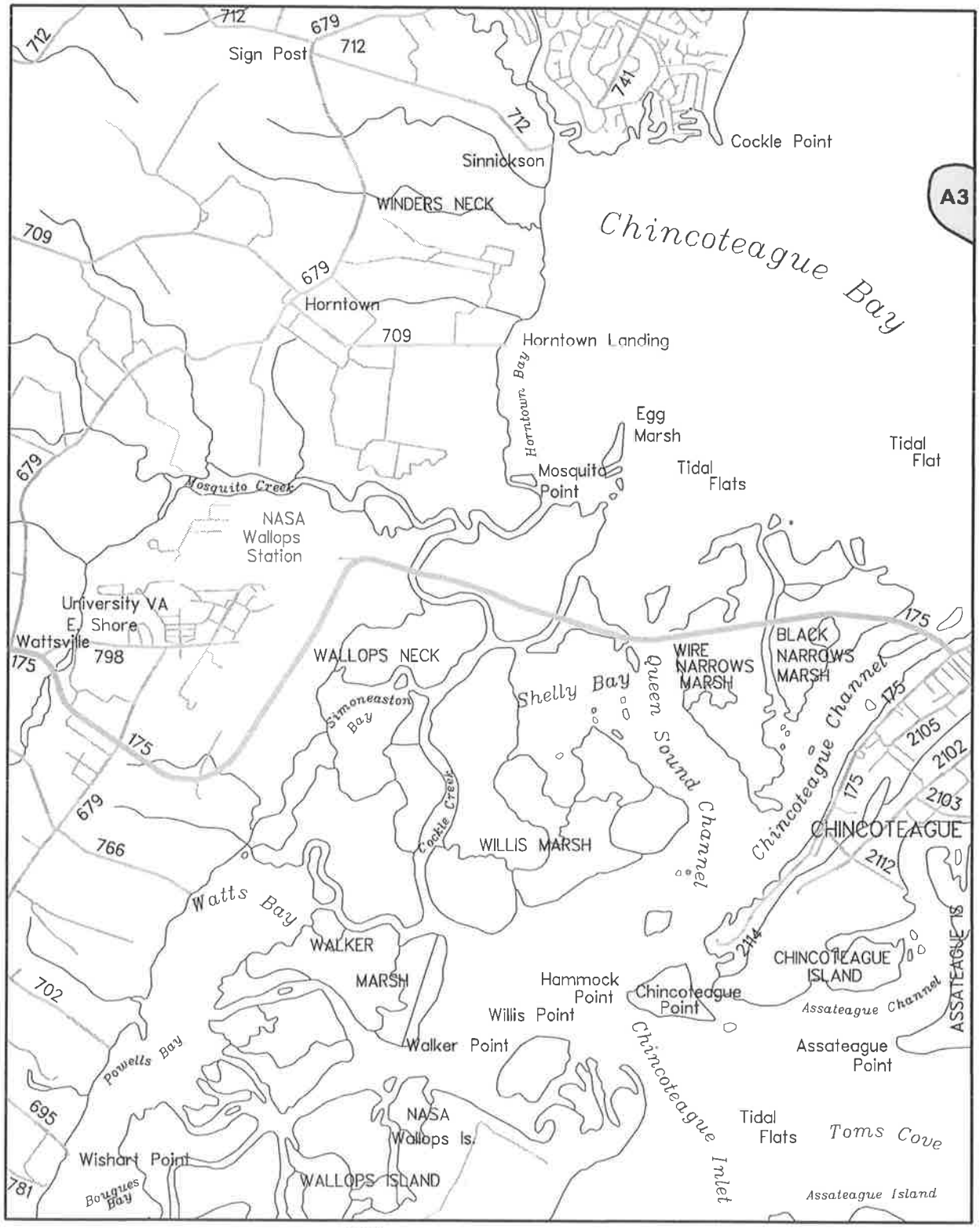
1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/31/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(174) Chincoteague West, Va.



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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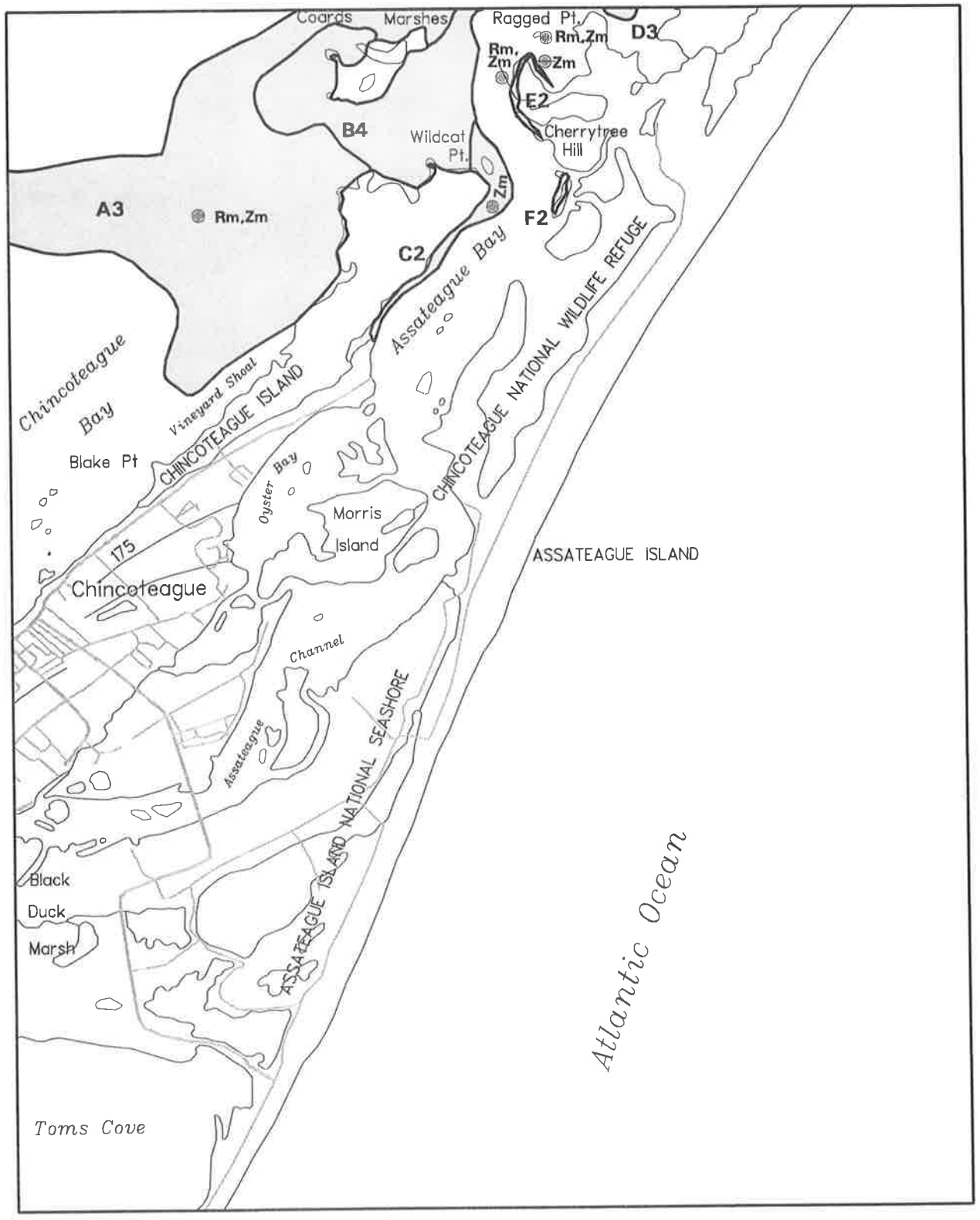
Submerged Aquatic Vegetation 1995

Chincoteague East, Va. (175)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

Produced by:
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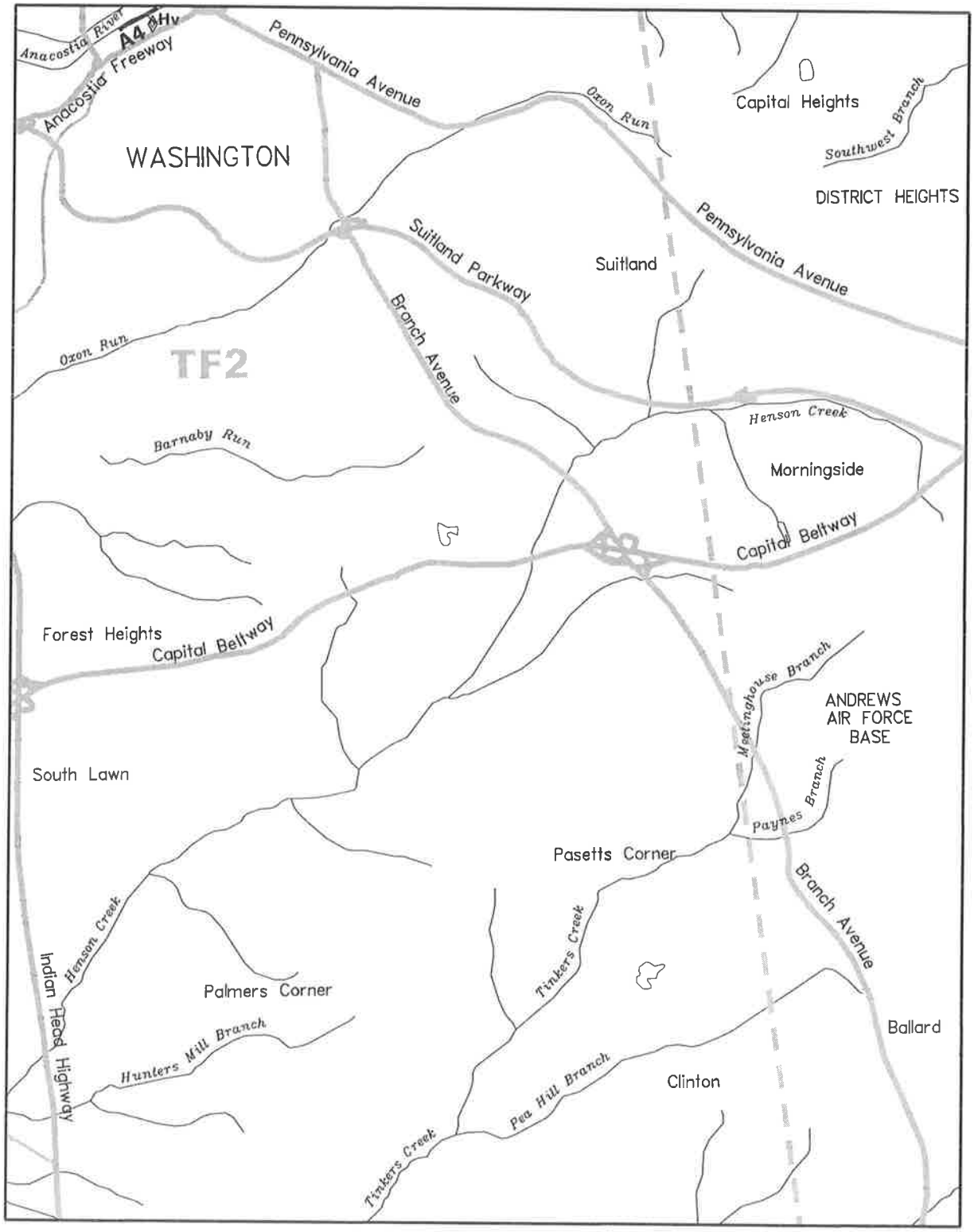
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(176) Anacostia, D.C.–Md.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 09/03/95

Produced by:
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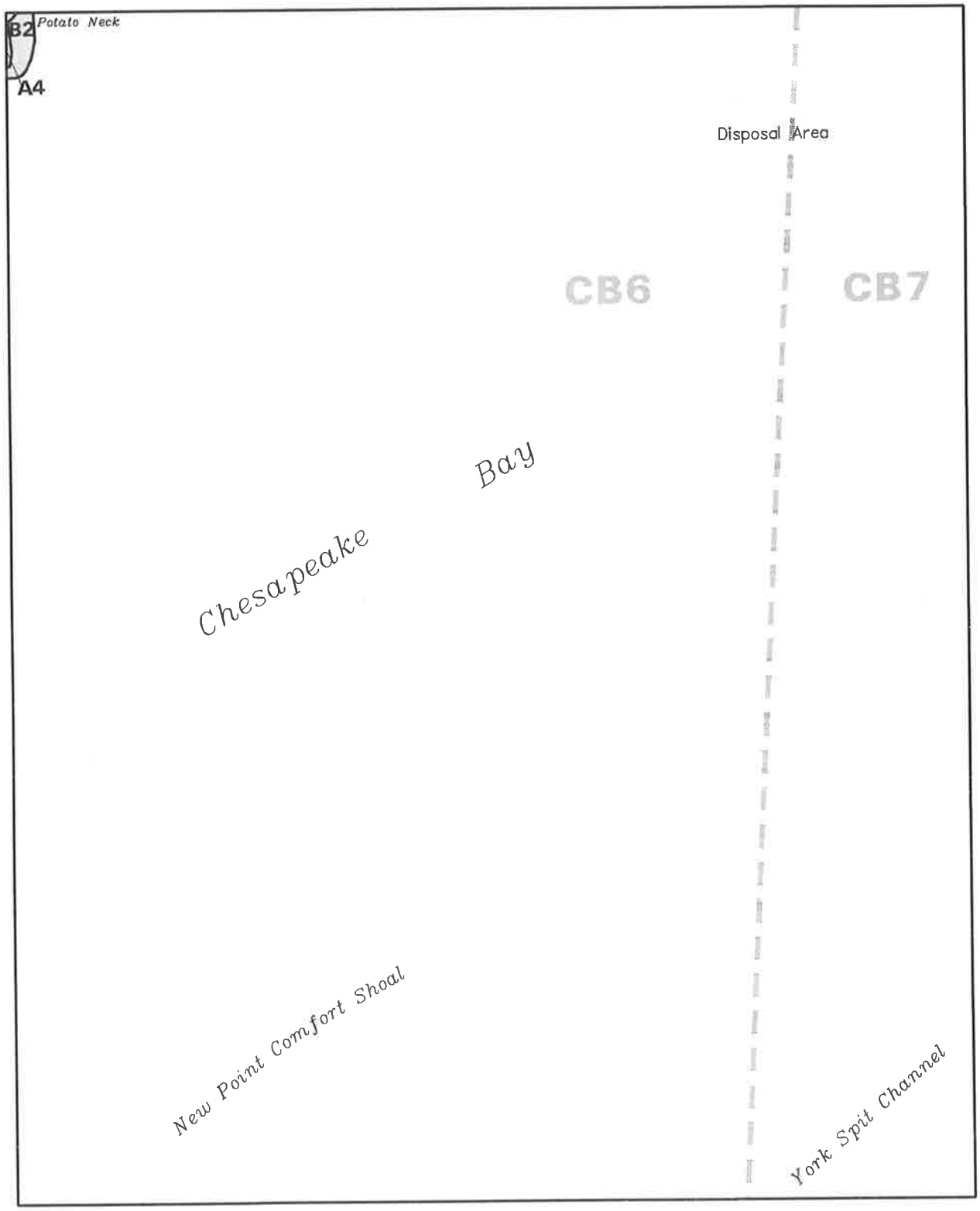
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

East of New Point Comfort, Va. (177)



1000 0 1000 2000 meters

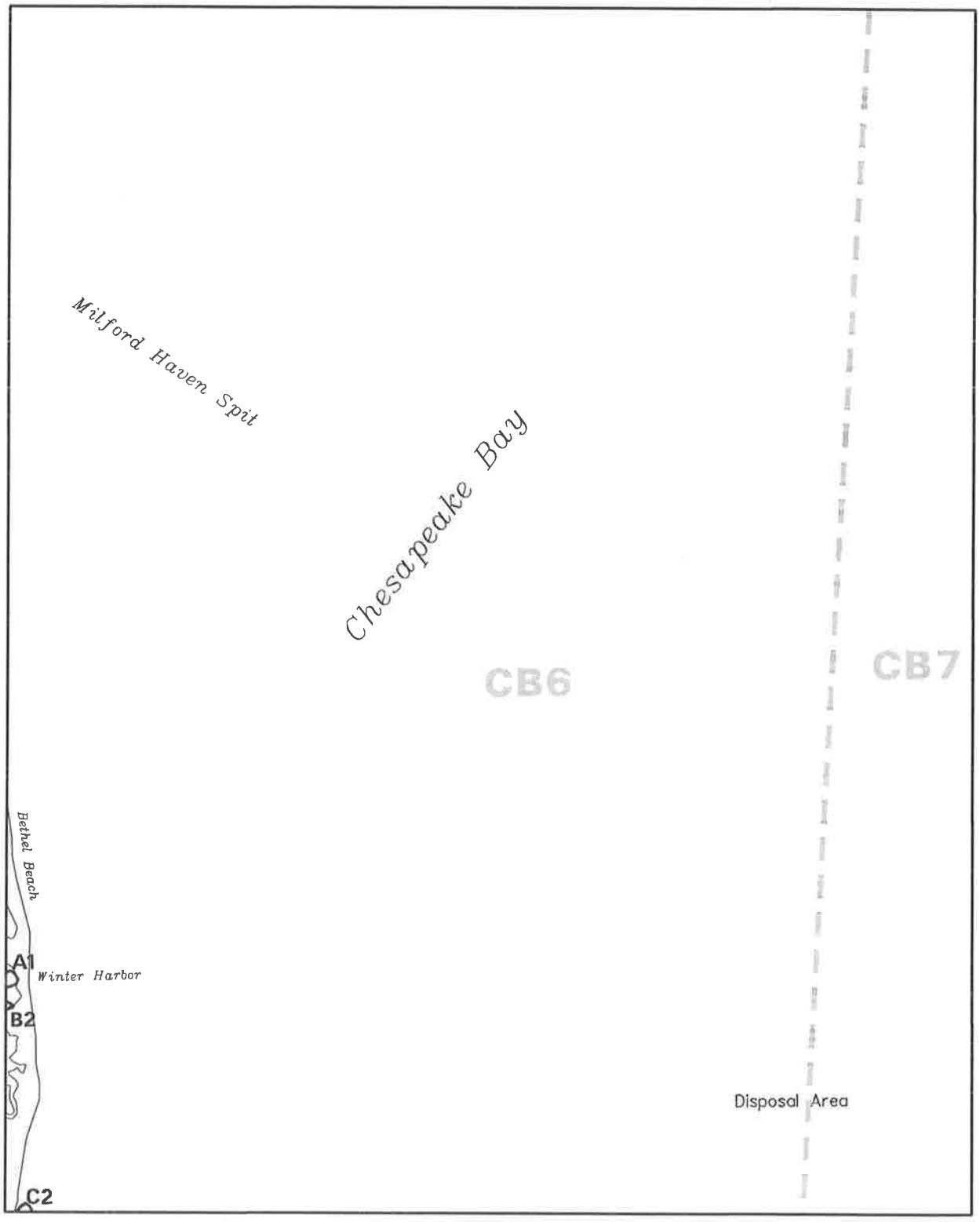
Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/20/95

Produced by:
School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

(178) Bethel Beach, Va.



Sources: Virginia Institute of Marine Science
U.S. Geological Survey
Date Flown: 05/20/95

Produced by:
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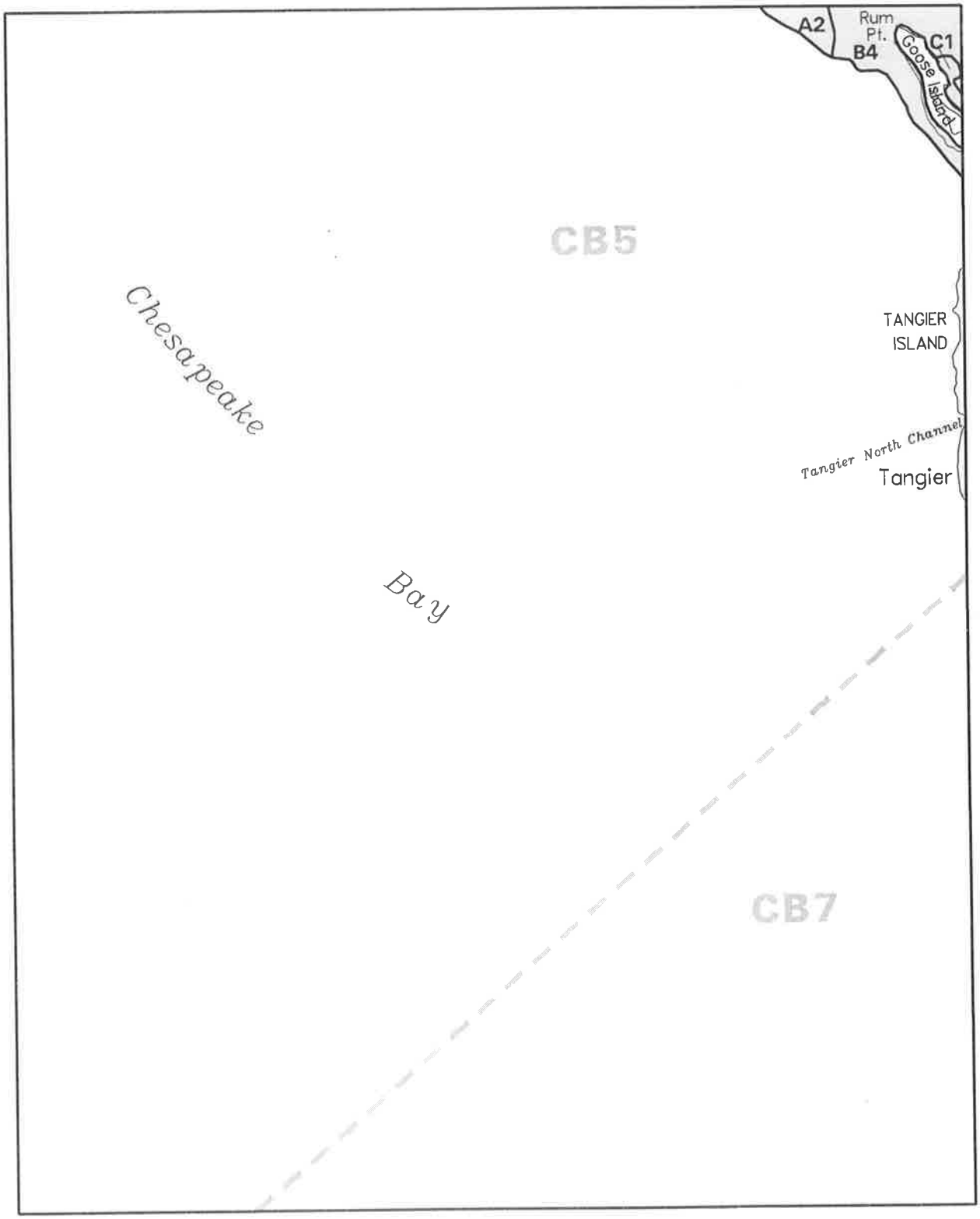
Virginia Institute of Marine Science
College of William and Mary

Submerged Aquatic Vegetation 1995

Goose Island, Va. (179)



1000 0 1000 2000 meters

Sources: Virginia Institute of Marine Science
U.S. Geological Survey

Date Flown: 05/31/95

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APPENDIX C

Number of Square Meters of SAV for Individual Beds and Totals for Density Categories for Each USGS 7.5 Minute Quadrangle in 1995.

APPENDIX C

Number of Square Meters of SAV for Individual Beds and Totals for Density Categories for Each USGS 7.5 Minute Quadrangle in 1995. [Numbers in Bed Labels (e.g., AA2) Indicate Density Category. See Maps in Appendix B for Location of Each Bed. Quadrangles Are Listed Numerically by VIMS Map Number. Slight Differences (1 Square Meter) in Quadrangle Totals from Density Totals Are Due to Rounding. See Methods and Figure 8 for Explanation of Density Categories.]

Aberdeen, Md. (VIMS Map # **002**)

A4	11,990	C4	4,574	E4	4,313	F3	5,578
B4	6,690	D2	88,134				

Density (1) 0 (2) 88,134 (3) 5,578 (4) 27,567 Total: 121,279

Havre de Grace, Md. (VIMS Map # **003**)

A1	2,354	M4	195,970	Y4	11,638	JA4	8,986
B1	2,504	N4	5,725	Z4	24,476	KA4	9,911
C2	7,601	O4	41,905	AA4	10,261	LA4	3,952
D4	13,179	P4	2,269	BA4	31,227	MA4	57,211
E4	44,301	Q4	2,086	CA4	21,130	NA4	90,821
F2	781,242	R4	2,406	DA4	57,248	OA4	60,530
G4	34,028	S4	8,611	EA3	1,182	PA3	91,014
H4	341,360	T4	133,776	FA3	2,410	QA2	88,852
I4	16,676	U3	51,192	GA3	479	RA4	559,372
J2	4,681	V4	3,342	HA4	3,410	SA1	90,549
K2	2,585	W4	11,392	IA4	4,843	TA1	15,699,415
L3	6,083	X4	11,014				

Density (1) 15,794,822 (2) 884,961 (3) 152,360 (4) 1,823,054 Total: 18,655,197

North East, Md. (VIMS Map # **004**)

A2	68,537	C1	8,842	E2	91,707	G1	58,816
B1	12,875	D1	84,896	F3	82,752		

Density (1) 165,430 (2) 160,243 (3) 82,752 (4) 0 Total: 408,425

SAV

Elkton, Md.-Del. (VIMS Map # **005**)

A2	366,414	B1	4,708

Density (1) 4,708 (2) 366,414 (3) 0 (4) 0 Total: 371,122

Edgewood, Md. (VIMS Map # **007**)

A2	48,424	C2	68,650	D2	3,718	E2	63,230
B3	32,183						

Density (1) 0 (2) 184,021 (3) 32,183 (4) 0 Total: 216,204

Perryman, Md. (VIMS Map # **008**)

A2	3,798	C2	17,774	D4	14,160	E3	2,898
B4	22,350						

Density (1) 0 (2) 21,572 (3) 2,898 (4) 36,510 Total: 60,980

Spesutie, Md. (VIMS Map # **009**)

A3	46,312	I3	6,437	Q2	475,627	Y4	7,667
B2	7,223	J2	5,473	R3	104,276	Z4	46,984
C2	17,743	K4	4,867	S2	45,440	AA4	4,546
D2	12,242	L3	5,042	T2	6,361	BA4	76,659
E2	9,265	M1	51,147	U2	14,974	CA3	55,599
F2	36,566	N1	581,611	V2	15,177	DA2	319,096
G2	13,066	O2	65,041	W2	14,586	EA2	6,185
H3	12,787	P3	8,439	X1	7,913		

Density (1) 640,671 (2) 1,064,063 (3) 238,892 (4) 140,724 Total: 2,084,350

Earleville, Md. (VIMS Map # **010**)

A2	33,889	F2	6,425	J2	50,538	N2	43,990
B2	51,242	G2	71,117	K2	13,863	O2	3,365
C2	79,653	H1	118,426	L2	103,182	P1	85,472
D4	424,508	I1	67,921	M2	64,803	Q4	16,460
E2	8,260						

Density (1) 271,819 (2) 530,328 (3) 0 (4) 440,968 Total: 1,243,115

Middle River, Md. (VIMS Map # **013**)

A1	14,562	B2	9,356

Density (1) 14,562 (2) 9,356 (3) 0 (4) 0 Total: 23,918

Gunpowder Neck, Md. (VIMS Map # **014**)

A2	11,268	G2	12,719	L1	25,300	Q2	2,476
B3	2,466	H3	6,903	M3	41,981	R2	2,248
C3	6,753	I2	1,822	N1	2,035	S2	57,629
D2	14,430	J2	6,804	O2	80,724	T2	13,793
E4	21,376	K3	44,841	P2	2,109	U3	9,545
F3	122,746						

Density (1) 27,335 (2) 206,023 (3) 235,234 (4) 21,376 Total: 489,967

Hanesville, Md. (VIMS Map # **015**)

A2	20,484	C3	4,484	D3	3,187	E2	4,629
B3	3,238						

Density (1) 0 (2) 25,112 (3) 10,909 (4) 0 Total: 36,021

Betterton, Md. (VIMS Map # **016**)

A3	165,830	C3	173,737	E2	57,890	G2	5,509
B1	348,409	D2	11,300	F1	94,608		

Density (1) 443,016 (2) 74,699 (3) 339,567 (4) 0 Total: 857,282

SAV

Galena, Md. (VIMS Map # **017**)

A2	90,537	D2	26,668	G2	138,527	I2	24,423
B2	39,622	E2	15,076	H2	11,787	J2	89,867
C2	11,273	F2	8,796				

Density (1) 0 (2) 456,576 (3) 0 (4) 0 Total: 456,576

Swan Point, Md. (VIMS Map # **020**)

A3	10,961	C4	23,893	E2	7,216	F3	75,621
B4	23,629	D4	54,888				

Density (1) 0 (2) 7,216 (3) 86,582 (4) 102,411 Total: 196,209

Rock Hall, Md. (VIMS Map # **021**)

A2	18,841	D4	87,275	G2	56,470	J4	12,862
B3	29,824	E3	8,197	H3	60,824	K4	123,160
C3	6,910	F2	20,038	I2	2,580		

Density (1) 0 (2) 97,928 (3) 105,755 (4) 223,297 Total: 426,981

Round Bay, Md. (VIMS Map # **023**)

A4	44,122	F2	46,746	K2	2,896	O2	19,538
B2	41,946	G1	7,481	L3	20,073	P3	3,075
C4	144,312	H3	21,340	M3	38,654	Q2	13,387
D1	38,580	I2	58,217	N4	5,672	R2	13,466
E4	13,775	J1	3,246				

Density (1) 49,307 (2) 196,197 (3) 83,141 (4) 207,881 Total: 536,525

Gibson Island, Md. (VIMS Map # **024**)

A3	17,555	E2	3,025	I2	15,406	M2	6,233
B2	17,812	F3	4,353	J2	4,997	N4	51,484
C3	26,550	G2	24,311	K1	6,199	O3	15,384
D3	11,806	H2	7,997	L3	76,743		

Density (1) 6,199 (2) 79,782 (3) 152,389 (4) 51,484 Total: 289,854

Langford Creek, Md. (VIMS Map # **026**)

A2	8,003	N3	11,084	Z1	58,062	LA3	16,823
B4	92,975	O4	19,410	AA4	69,252	MA3	19,586
C2	86,084	P2	5,628	BA2	79,920	NA3	27,778
D3	18,416	Q4	3,302	CA4	95,847	OA4	8,522
E3	16,260	R3	8,144	DA2	38,661	PA2	7,077
F2	7,695	S4	38,289	EA2	21,577	QA2	16,684
G4	79,721	T2	9,316	FA4	137,246	RA3	34,500
H1	8,769	U2	255,460	GA4	742,493	SA2	13,039
I2	4,702	V4	131,509	HA2	85,347	TA2	33,173
J4	83,356	W4	13,623	IA4	177,807	UA4	2,438,758
K3	3,114	X4	20,074	JA3	85,911	VA1	206,112
L2	5,835	Y4	48,035	KA3	5,763	WA4	303,860
M2	4,296						

Density (1) 272,943 (2) 682,497 (3) 247,377 (4) 4,504,079 Total: 5,706,896

Washington West, Md.- D.C.- Va (VIMS Map # **028**)

A4	2,118	D4	26,249	G4	6,514	J4	143,605
B4	2,189	E4	3,259	H4	8,936	K4	41,143
C4	33,796	F4	3,576	I4	125,580		

Density (1) 0 (2) 0 (3) 0 (4) 396,964 Total: 396,964

Washington East, D.C.- Md. (VIMS Map # **029**)

A3 9,880

Density (1) 0 (2) 0 (3) 9,880 (4) 0 Total: 9,880

South River, Md. (VIMS Map # **030**)

A2 18,276

Density (1) 0 (2) 18,276 (3) 0 (4) 0 Total: 18,276

SAV

Kent Island, Md. (VIMS Map # **032**)

A2	67,503	M2	31,194	X2	257,028	IA2	46,401
B3	156,778	N3	90,756	Y1	33,770	JA2	81,330
C3	55,075	O3	50,693	Z4	585,009	KA1	5,097
D3	33,640	P2	191,168	AA1	173,271	LA2	12,351
E3	174,210	Q4	82,492	BA2	139,227	MA2	11,187
F3	116,635	R2	283,144	CA3	27,478	NA2	19,976
G1	144,461	S4	346,956	DA2	41,865	OA2	20,261
H2	465,693	T2	545,338	EA1	13,382	PA2	17,070
I2	173,170	U2	99,190	FA2	58,208	QA2	8,132
J2	108,788	V2	62,726	GA2	47,331	RA3	138,628
K2	97,911	W2	4,029	HA3	169,374	SA2	44,146
L3	34,054						

Density (1) 369,981 (2) 2,934,366 (3) 1,047,320 (4) 1,014,457 Total: 5,366,125

Queenstown, Md. (VIMS Map # **033**)

A2	119,461	J3	46,867	S2	10,446	BA4	33,022
B2	25,758	K2	136,772	T2	6,215	CA4	55,354
C1	119,161	L2	63,777	U4	23,387	DA2	365,859
D1	34,609	M2	97,948	V3	11,732	EA3	310,811
E3	377,471	N2	325,250	W4	56,872	FA4	80,357
F1	91,166	O4	194,036	X1	3,908	GA2	3,447
G2	213,174	P2	22,050	Y4	63,055	HA4	89,685
H1	72,733	Q4	60,550	Z4	155,816	IA3	27,401
I3	142,103	R2	26,257	AA2	77,035		

Density (1) 321,578 (2) 1,493,448 (3) 916,385 (4) 812,134 Total: 3,543,545

Alexandria, Va.- D.C.- Md. (VIMS Map # **034**)

A2	3,975	L4	40,077	W4	6,178	HA3	12,175
B2	13,665	M4	1,377	X4	33,969	IA2	713
C2	37,837	N4	11,431	Y4	33,672	JA2	686
D4	66,049	O4	31,514	Z4	548,499	KA2	1,213
E2	12,853	P4	1,631	AA4	18,774	LA4	18,317
F4	7,603	Q4	121,143	BA4	7,857	MA2	7,133
G2	6,581	R2	73,615	CA3	5,100	NA3	3,924
H1	141,280	S3	41,301	DA4	5,382	OA3	2,457
I4	208,945	T3	1,273	EA2	18,235	PA2	4,884
J4	1,071,584	U4	4,278	FA4	37,043	QA4	38,042
K4	4,314	V3	1,386	GA2	70,072		

Density (1) 141,280 (2) 251,461 (3) 67,617 (4) 2,317,678 Total: 2,778,036

Claiborne, Md. (VIMS Map # **036**)

A2	155,735	L2	37,781	W2	91,828	HA3	9,914
B2	76,416	M3	518,986	X3	169,895	IA2	9,640
C3	88,095	N4	354,849	Y3	309,875	JA3	6,011
D3	19,731	O3	26,943	Z2	852,865	KA3	17,160
E3	39,102	P2	10,631	AA2	24,571	LA2	7,765
F3	19,664	Q2	7,758	BA2	171,003	MA2	23,104
G2	65,096	R2	40,630	CA4	301,097	NA2	33,497
H3	114,638	S2	20,465	DA1	106,572	OA4	19,323
I3	85,941	T2	63,502	EA2	170,285	PA1	223,271
J3	107,216	U3	130,138	FA2	239,441	QA3	84,806
K3	40,988	V3	191,245	GA3	253,948	RA1	39,555

Density (1) 369,398 (2) 2,102,013 (3) 2,234,296 (4) 675,269 Total: 5,380,976

SAV

St. Michaels, Md. (VIMS Map # **037**)

A3	37,587	N4	13,603	AA3	130,092	NA2	77,678
B3	22,375	O4	68,720	BA1	148,574	OA2	47,461
C2	165,352	P3	34,837	CA4	74,862	PA2	54,678
D3	100,286	Q2	238,037	DA2	9,333	QA2	186,259
E3	48,971	R3	29,304	EA4	146,760	RA4	129,323
F3	33,483	S3	63,076	FA2	144,289	SA4	16,743
G3	49,802	T1	392,174	GA3	32,531	TA4	125,665
H3	33,773	U2	7,678	HA3	39,761	UA2	91,492
I2	32,113	V2	111,302	IA2	22,543	VA2	192,233
J4	325,903	W3	28,564	JA3	18,619	WA2	25,765
K2	125,077	X2	252,274	KA1	39,482	XA3	61,585
L2	221,459	Y3	24,804	LA2	3,787	YA3	35,984
M3	14,872	Z1	93,735	MA2	39,657		

Density (1) 673,965 (2) 2,048,468 (3) 840,307 (4) 901,579 Total: 4,464,318

Easton, Md. (VIMS Map # **038**)

A4	6,729	C4	14,459	D4	12,672	E4	13,953
B4	14,568						

Density (1) 0 (2) 0 (3) 0 (4) 62,380 Total: 62,380

Fort Belvoir, Va.- Md. (VIMS Map # **039**)

A3	36,067	D4	166,428	G4	328,141	J3	8,193
B3	4,850	E2	36,848	H4	289,425	K4	58,099
C4	12,883	F3	211,170	I3	1,613		

Density (1) 0 (2) 36,848 (3) 261,892 (4) 854,975 Total: 1,153,716

Mt. Vernon, Md.- Va. (VIMS Map # **040**)

A4	44,806	G4	18,506	M4	60,359	S2	34,900
B4	34,344	H2	15,231	N4	57,844	T4	307,009
C4	9,822	I4	80,337	O2	11,910	U4	4,993
D4	19,179	J2	9,497	P3	7,964	V2	12,116
E2	39,819	K4	193,646	Q3	6,651	W4	61,780
F2	49,629	L2	8,696	R4	29,378		

Density (1) 0 (2) 181,799 (3) 14,615 (4) 922,002 Total: 1,118,415

Lower Marlboro, Md. (VIMS Map # **041**)

A4	136,347	D3	10,840	G3	52,032	J3	19,512
B4	36,183	E4	33,772	H2	73,966	K3	6,330
C3	126,804	F3	26,429	I2	18,022		

Density (1) 0 (2) 91,988 (3) 241,947 (4) 206,302 Total: 540,237

Tilghman, Md. (VIMS Map # **043**)

A2	96,554	F3	61,552	J2	494,602	N2	31,780
B3	133,449	G2	28,812	K3	114,050	O2	24,306
C3	28,187	H4	1,038,541	L4	492,490	P3	5,315
D3	13,837	I2	196,480	M3	85,669	Q3	48,008
E3	2,707						

Density (1) 0 (2) 872,533 (3) 492,774 (4) 1,531,031 Total: 2,896,338

Oxford, Md. (VIMS Map # **044**)

A2	15,380	J4	8,698	S3	23,191	BA3	48,163
B3	8,138	K2	171,119	T3	402,781	CA3	7,311
C2	11,691	L3	171,613	U4	410,957	DA3	24,560
D2	57,499	M1	47,444	V4	478,497	EA3	46,053
E2	15,221	N3	128,516	W2	40,272	FA4	347,254
F3	5,197	O3	41,435	X2	29,543	GA3	104,876
G2	9,236	P3	107,501	Y3	14,937	HA3	37,311
H4	9,700	Q2	7,107	Z3	12,678	IA2	124,696
I4	4,595	R2	52,532	AA4	56,241	JA2	135,204

Density (1) 47,444 (2) 669,499 (3) 1,184,263 (4) 1,315,942 Total: 3,217,147

SAV

Trappe, Md. (VIMS Map # **045**)

A4	50,831	C3	15,040	E4	4,555	G4	15,978
B4	31,470	D3	5,722	F3	3,804		

Density (1) 0 (2) 0 (3) 24,566 (4) 102,834 Total: 127,401

Quantico, Va.- Md. (VIMS Map # **047**)

A4	39,568	E4	85,021	I4	10,370	M3	2,821
B4	228,781	F4	67,706	J2	27,459	N4	14,776
C4	1,140,588	G4	8,335	K2	10,482	O4	136,433
D4	736,629	H4	217,624	L4	45,617		

Density (1) 0 (2) 37,942 (3) 2,821 (4) 2,731,448 Total: 2,772,210

Indian Head, Va.- Md. (VIMS Map # **048**)

A3	1,310	C4	53,861	E3	29,546	G3	138,670
B4	22,181	D4	4,701	F3	3,145	H4	130,095

Density (1) 0 (2) 0 (3) 172,670 (4) 210,838 Total: 383,508

Hudson, Md. (VIMS Map # **051**)

A3	69,116	D4	416,925	G3	189,119	I3	719,475
B2	23,197	E2	1,546,753	H1	108,022	J2	364,327
C3	10,062	F1	649,906				

Density (1) 757,928 (2) 1,934,276 (3) 987,772 (4) 416,925 Total: 4,096,901

Church Creek, Md. (VIMS Map # **052**)

A1	161,852	B2	502,088	C1	121,942

Density (1) 283,794 (2) 502,088 (3) 0 (4) 0 Total: 785,882

Widewater, Va.- Md. (VIMS Map # **055**)

A4	53,440	F1	27,718	K4	434,507	P4	47,511
B2	28,517	G4	157,237	L2	274,366	Q2	15,035
C4	554,713	H4	124,545	M4	5,883	R4	116,706
D4	336,005	I4	3,862	N4	22,251	S3	128,595
E4	94,520	J4	3,602	O4	31,799		

Density (1) 27,718 (2) 317,918 (3) 128,595 (4) 1,986,579 Total: 2,460,810

Nanjemoy, Md. (VIMS Map # **056**)

A4	402,081	H4	5,092	N4	132,489	T4	37,099
B4	29,634	I4	179,564	O3	1,537	U4	13,713
C4	11,597	J4	5,188	P4	4,273	V4	25,707
D4	3,901	K4	7,761	Q3	3,540	W4	18,645
E4	3,460	L4	18,429	R4	43,528	X4	28,224
F4	7,554	M4	11,632	S4	22,097	Y4	42,505
G4	2,765						

Density (1) 0 (2) 0 (3) 5,077 (4) 1,056,938 Total: 1,062,015

Mathias Point, Md.- Va. (VIMS Map # **057**)

A2	29,972	H4	100,646	O4	6,337	V4	4,561
B4	252,643	I2	19,924	P4	13,529	W2	3,208
C2	25,023	J4	40,094	Q2	6,033	X4	30,002
D4	252,949	K3	63,625	R2	11,857	Y2	6,074
E2	33,810	L4	936,619	S4	129,315	Z4	3,527
F4	6,096	M4	56,536	T3	51,998	AA4	7,246
G4	158,472	N4	11,384	U4	121,656	BA4	57,097

Density (1) 0 (2) 135,901 (3) 115,623 (4) 2,188,708 Total: 2,440,232

Popes Creek, Md. (VIMS Map # **058**)

A2	1,921	B2	16,418	C3	5,626

Density (1) 0 (2) 18,339 (3) 5,626 (4) 0 Total: 23,965

SAV

Taylors Island, Md. (VIMS Map # **062**)

A2	43,977	B2	37,131				
Density (1) 0		(2) 81,108		(3) 0		(4) 0	Total: 81,108

Golden Hill, Md. (VIMS Map # **063**)

A2	347,772						
Density (1) 0		(2) 347,772		(3) 0		(4) 0	Total: 347,772

Passapatanzy, Md.- Va. (VIMS Map # **064**)

A1	29,787	D4	8,916	G4	201,593	J4	349,825
B4	232,001	E4	19,326	H4	44,478	K2	29,639
C3	15,808	F4	16,844	I4	264,414		
Density (1) 29,787		(2) 29,639		(3) 15,808		(4) 1,137,396	Total: 1,212,629

King George, Va.- Md. (VIMS Map # **065**)

A4	317,155	B4	326,842	C4	215,609		
Density (1) 0		(2) 0		(3) 0		(4) 859,606	Total: 859,606

Dahlgren, Va.- Md. (VIMS Map # **066**)

A4	11,299	D4	4,995	G2	161,239	I4	95,696
B3	6,389	E4	7,705	H4	81,601	J4	23,562
C3	16,172	F3	6,007				
Density (1) 0		(2) 161,239		(3) 28,568		(4) 224,858	Total: 414,664

Colonial Beach North, Md.- Va. (VIMS Map # **067**)

A4	67,344	D4	223,313	F4	42,557	H4	75,048
B4	605,368	E4	103,534	G2	129,170	I2	3,734
C4	1,932						
Density (1) 0		(2) 132,904		(3) 0		(4) 1,119,096	Total: 1,251,999

Rock Point, Md. (VIMS Map # **068**)

A4	38,002	B4	70,359	C3	20,045		

Density (1) 0 (2) 0 (3) 20,045 (4) 108,361 Total: 128,406

Leonardtown, Md. (VIMS Map # **069**)

A3	185,734

Density (1) 0 (2) 0 (3) 185,734 (4) 0 Total: 185,734

Honga, Md. (VIMS Map # **073**)

A2	39,404	G2	144,316	M1	39,804	S2	160,173
B2	33,803	H1	102,999	N2	39,466	T2	22,820
C2	213,640	I4	52,909	O1	120,967	U1	49,211
D4	39,265	J2	3,756	P2	595,243	V2	14,992
E1	298,970	K2	23,118	Q4	223,934	W2	19,153
F4	1,249,954	L2	175,834	R2	436,849		

Density (1) 611,951 (2) 1,922,566 (3) 0 (4) 1,566,061 Total: 4,100,579

Wingate, Md. (VIMS Map # **074**)

A2	63,458	C4	1,398,151	E3	1,427,691	G4	295,168
B1	138,857	D4	354,227	F2	398,751		

Density (1) 138,857 (2) 462,209 (3) 1,427,691 (4) 2,047,546 Total: 4,076,304

Stratford Hall, Va.- Md. (VIMS Map # **077**)

A3	40,155	B2	31,587	C3	21,377

Density (1) 0 (2) 31,587 (3) 61,532 (4) 0 Total: 93,119

St. Clements Island, Va.- Md. (VIMS Map # **078**)

A3	191,110

Density (1) 0 (2) 0 (3) 191,110 (4) 0 Total: 191,110

SAV

St. Marys City, Md. (VIMS Map # **080**)

A3	28,878

Density (1) 0 (2) 0 (3) 28,878 (4) 0 Total: 28,878

Bloodsworth Island, Md. (VIMS Map # **083**)

A1	51,166	F2	1,040,417	J2	130,310	N2	416,555
B1	149,420	G2	3,582	K3	152,962	O4	40,849
C2	259,047	H3	475,473	L2	215,526	P2	67,403
D2	8,354	I2	133,385	M2	9,479	Q2	15,298
E2	1,269,806						

Density (1) 200,585 (2) 3,569,163 (3) 628,435 (4) 40,849 Total: 4,439,032

Deal Island, Md. (VIMS Map # **084**)

A2	2,539	C3	46,305	E2	115,611	G2	21,996
B3	6,316	D3	38,391	F2	52,477	H2	19,789

Density (1) 0 (2) 212,412 (3) 91,013 (4) 0 Total: 303,424

Monie, Md. (VIMS Map # **085**)

A4	17,493	B2	10,632	C3	13,994

Density (1) 0 (2) 10,632 (3) 13,994 (4) 17,493 Total: 42,118

Kedges Straits, Md. (VIMS Map # **091**)

A2	180,946	F1	385,820	J3	211,640	N3	265,099
B2	78,179	G3	604,387	K1	72,638	O2	188,640
C2	2,033,947	H2	287,842	L3	129,239	P1	86,291
D2	140,994	I2	41,921	M2	12,405	Q1	101,711
E2	40,631						

Density (1) 646,461 (2) 3,005,505 (3) 1,210,366 (4) 0 Total: 4,862,332

Terrapin Sand Point, Md. (VIMS Map # **092**)

A2	176,586	D3	252,111	G3	82,376	I3	17,767
B4	557,191	E3	29,163	H3	5,747	J4	67,124
C2	599,944	F4	42,895				

Density (1) 0 (2) 776,531 (3) 387,164 (4) 667,210 Total: 1,830,906

Marion, Md. (VIMS Map # **093**)

A2	18,881	K2	24,943	U2	6,651	EA2	57,095
B2	193,868	L1	92,131	V2	15,211	FA2	8,023
C2	54,506	M2	68,768	W2	8,673	GA4	64,090
D1	68,207	N4	268,314	X2	11,699	HA2	11,122
E3	142,897	O1	18,822	Y2	2,894	IA2	102,614
F3	37,702	P2	86,086	Z3	8,189	JA2	8,392
G2	110,823	Q1	6,182	AA1	70,408	KA2	25,438
H2	23,705	R3	24,506	BA4	11,894	LA2	3,568
I1	20,602	S1	11,774	CA3	64,070	MA2	8,194
J4	568,885	T2	65,696	DA3	171,399	NA3	57,961

Density (1) 288,126 (2) 916,848 (3) 506,725 (4) 913,184 Total: 2,624,883

Ewell, Md.- Va. (VIMS Map # **099**)

A2	51,198	G2	136,007	M3	31,866	S2	1,254
B4	7,448,788	H4	728,256	N2	45,638	T2	2,850
C2	5,626,776	I2	458,796	O2	19,563	U2	22,112
D3	721,515	J1	50,124	P2	26,295	V1	30,085
E2	284,894	K2	15,723	Q1	41,115	W2	142,780
F2	5,362	L2	71,478	R2	5,229		

Density (1) 121,324 (2) 6,915,954 (3) 753,381 (4) 8,177,043 Total: 15,967,702

SAV

Great Fox Island, Va.- Md. (VIMS Map # **100**)

A2	1,280,236	F4	413,602	K2	4,076	P2	52,363
B4	5,031,748	G4	71,132	L2	195,658	Q2	101,199
C1	69,932	H2	69,514	M4	2,372,295	R2	577,819
D2	95,507	I2	40,652	N2	175,002	S4	814,149
E2	162,332	J2	2,913	O2	77,857		

Density (1) 69,932 (2) 2,835,127 (3) 0 (4) 8,702,927 Total: 11,607,986

Crisfield, Md.- Va. (VIMS Map # **101**)

A4	197,780	H2	1,430	O3	81,892	V3	66,685
B3	457,524	I1	47,447	P4	202,141	W2	10,374
C3	181,308	J2	4,271	Q2	8,221	X2	4,622
D2	103,944	K2	12,994	R2	37,709	Y2	32,012
E2	68,103	L2	7,901	S2	2,668	Z1	3,957
F2	25,432	M3	27,904	T2	21,443	AA3	1,620
G2	90,884	N2	54,859	U2	40,900	BA2	2,146

Density (1) 51,404 (2) 529,912 (3) 816,933 (4) 399,921 Total: 1,798,171

Saxis, Va.- Md. (VIMS Map # **102**)

A2	532	B2	4,235	C2	15,331	D2	5,210

Density (1) 0 (2) 25,307 (3) 0 (4) 0 Total: 25,307

Reedville, Va. (VIMS Map # **106**)

A1	14,393	C1	197,548	E2	557,993	G3	351,846
B2	106,134	D4	534,917	F1	731,655	H1	6,703

Density (1) 950,298 (2) 664,127 (3) 351,846 (4) 534,917 Total: 2,501,189

Tangier Island, Va. (VIMS Map # **107**)

A2	300,107	E1	73,973	I2	70,250	L4	1,540,266
B3	103,799	F1	284,709	J4	273,893	M1	199,861
C1	184,712	G2	162,044	K2	468,949	N2	120,518
D4	813,899	H2	44,576				

Density (1) 743,255 (2) 1,166,443 (3) 103,799 (4) 2,628,058 Total: 4,641,556

Chesconessex, Va. (VIMS Map # **108**)

A1	3,573	J3	181,304	S4	391,600	AA1	28,879
B1	39,452	K2	17,640	T1	1,223,830	BA3	1,603,107
C1	106,172	L3	3,568	U3	151,071	CA1	272,950
D3	137,631	M3	104,275	V2	128,607	DA1	403,046
E3	37,951	N4	1,200,555	W4	811,659	EA4	296,415
F3	1,969	O3	463,058	X1	22,307	FA2	64,976
G4	403,770	P1	369,996	Y1	25,824	GA3	59,882
H2	496,147	Q2	265,858	Z3	134,954	HA2	5,133
I4	291,799	R4	177,883				

Density (1) 2,496,028 (2) 978,362 (3) 2,878,772 (4) 3,573,681 Total: 9,926,842

Parksley, Va. (VIMS Map # **109**)

A2	126,557	I2	7,668	Q1	97,272	Y2	2,587
B2	270,410	J3	2,798	R2	178,126	Z2	2,066
C4	1,475,201	K3	25,256	S3	60,477	AA2	5,835
D3	704,042	L2	8,041	T2	103,793	BA2	790
E1	110,652	M2	15,926	U2	74,335	CA2	17,855
F4	265,043	N2	986	V2	57,559	DA1	35,439
G1	60,101	O3	3,861	W3	29,092	EA2	15,805
H1	38,642	P4	67,103	X2	39,578		

Density (1) 342,106 (2) 927,917 (3) 825,526 (4) 1,807,348 Total: 3,902,898

Irvington, Va. (VIMS Map # **111**)

A3	19,957	C2	2,607	E2	17,504	G2	19,259
B1	2,237	D2	2,173	F2	43,733	H1	9,853

Density (1) 12,090 (2) 85,275 (3) 19,957 (4) 0 Total: 117,322

SAV

Fleets Bay, Va. (VIMS Map # **112**)

A1	1,033,940	G1	22,871	M2	1,713	R2	245,977
B2	5,070	H2	52,638	N2	9,449	S2	108,301
C4	41,571	I2	1,054,460	O1	16,598	T2	8,841
D2	920,834	J3	18,589	P2	119,528	U2	65,572
E2	297,356	K2	27,637	Q2	364,224	V2	91,812
F1	17,731	L2	1,937				

Density (1) 1,091,140 (2) 3,375,349 (3) 18,589 (4) 41,571 Total: 4,526,649

Nandua Creek, Va. (VIMS Map # **113**)

A1	77,827	E2	27,466	H2	643,103	K3	205,019
B3	71,882	F4	551,810	I4	205,771	L1	148,628
C1	15,388	G1	187,102	J1	75,727	M1	1,160,710
D1	508						

Density (1) 1,665,889 (2) 670,569 (3) 276,901 (4) 757,581 Total: 3,370,941

Pungoteague, Va. (VIMS Map # **114**)

A1	5,471	I1	1,953,680	Q1	62,279	X2	7,487
B2	20,916	J2	189,501	R3	60,746	Y4	56,001
C1	83,718	K2	11,765	S2	3,140	Z4	69,394
D2	250,797	L2	7,142	T2	2,602	AA1	216,136
E2	65,391	M1	123,651	U2	12,567	BA1	441,441
F4	361,594	N3	442,840	V2	24,616	CA3	22,277
G1	10,602	O1	418,662	W2	1,906	DA1	12,228
H4	3,204,987	P3	51,462				

Density (1) 3,327,870 (2) 597,829 (3) 577,325 (4) 3,691,975 Total: 8,194,998

Deltaville, Va. (VIMS Map # **118**)

A1	7,279	C1	597,536	E2	1,230	G2	72,251
B2	171,948	D3	16,235	F1	338,294		

Density (1) 943,109 (2) 245,430 (3) 16,235 (4) 0 Total: 1,204,774

Jamesville, Va. (VIMS Map # **119**)

A1	46,221	I4	24,242	P1	148,121	W1	91,808
B2	16,266	J3	76,259	Q3	29,288	X4	243,903
C1	8,392	K1	526,372	R2	46,022	Y2	60,432
D1	508,586	L2	684,027	S3	519,235	Z4	95,781
E2	202,413	M4	138,016	T2	399,955	AA1	49,541
F4	448,548	N1	484,790	U1	26,667	BA2	55,911
G4	11,084	O4	125,207	V4	156,819	CA2	20,378
H2	18,012						

Density (1) 1,890,499 (2) 1,503,417 (3) 624,782 (4) 1,243,602 Total: 5,262,300

Ware Neck, Va. (VIMS Map # **122**)

A1	122,086	E2	62,839	H3	549,022	K2	378,037
B4	783,108	F3	185,621	I4	117,390	L1	61,909
C2	165,405	G3	272,339	J2	32,166	M3	42,838
D3	139,244						

Density (1) 183,995 (2) 638,447 (3) 1,189,064 (4) 900,498 Total: 2,912,005

Mathews, Va. (VIMS Map # **123**)

A4	54,545	H2	118,933	N1	12,743	T1	15,300
B4	179,094	I1	11,385	O2	172,639	U1	3,196
C4	23,378	J2	45,696	P2	7,437	V2	42,808
D2	24,429	K2	153,016	Q2	24,205	W2	12,276
E2	40,671	L1	30,433	R2	6,478	X1	8,087
F2	64,015	M4	207,491	S3	106,773	Y2	4,749
G4	33,440						

Density (1) 81,142 (2) 717,352 (3) 106,773 (4) 497,949 Total: 1,403,217

SAV

Franktown, Va. (VIMS Map # **124**)

A4	70,671	G3	213,184	M3	127,891	S1	23,967
B1	736,246	H2	164,525	N1	9,071	T1	192,779
C3	1,192,517	I4	1,277,899	O3	296,859	U2	2,226
D1	39,603	J1	753,047	P2	49,105	V2	3,382
E1	24,821	K1	52,917	Q2	36,652	W3	1,933
F3	75,277	L2	314,506	R4	186,478		

Density (1) 1,832,450 (2) 570,395 (3) 1,907,661 (4) 1,535,048 Total: 5,845,554

Achilles, Va. (VIMS Map # **131**)

A2	7,179	K4	1,506,707	U4	1,693,973	EA4	1,546,251
B2	62,057	L2	19,260	V2	10,495	FA2	90,355
C3	103,835	M4	307,880	W2	29,952	GA2	42,617
D3	18,650	N2	20,149	X4	1,207,889	HA4	1,171,798
E2	97,939	O4	22,918	Y2	55,528	IA2	93,885
F4	593,373	P4	46,555	Z2	19,487	JA3	61,167
G2	58,360	Q1	212,848	AA2	11,912	KA2	121,924
H2	64,102	R1	9,921	BA2	3,416	LA4	85,880
I4	825,287	S4	87,804	CA4	58,099	MA4	62,522
J1	150,222	T2	151,746	DA2	196,560	NA3	62,476

Density (1) 372,991 (2) 1,156,922 (3) 246,128 (4) 9,216,936 Total: 10,992,977

New Point Comfort, Va. (VIMS Map # **132**)

A4	5,422,393	H2	113,405	O1	88,503	V4	1,028,138
B1	185,628	I2	47,237	P4	61,638	W1	29,312
C2	385,767	J3	524,212	Q1	459,178	X4	1,677,724
D4	112,014	K4	333,283	R4	1,023,431	Y4	181,176
E4	89,778	L1	27,248	S3	40,192	Z4	849,794
F2	7,297	M1	288,784	T2	68,110	AA4	317,122
G4	1,424,539	N2	433,759	U1	72,354		

Density (1) 1,151,006 (2) 1,055,576 (3) 564,404 (4) 12,521,030 Total: 15,292,017

Cape Charles, Va. (VIMS Map # **133**)

A2	268,731	E2	44,283	H2	48,958	K2	1,201,025
B4	22,348	F4	600,881	I3	65,635	L4	607,711
C2	141,489	G2	98,748	J4	162,524	M2	47,478
D4	217,352						

Density (1) 0 (2) 1,850,712 (3) 65,635 (4) 1,610,815 Total: 3,527,162

Cheriton, Va. (VIMS Map # **134**)

A2	207,575	C4	242,808	D4	76,565	E2	203,451
B1	120,355						

Density (1) 120,355 (2) 411,026 (3) 0 (4) 319,374 Total: 850,755

Yorktown, Va. (VIMS Map # **139**)

A1	20,405	C2	17,174	E1	434	G2	3,236
B1	1,438	D1	1,041	F2	2,147		

Density (1) 23,318 (2) 22,557 (3) 0 (4) 0 Total: 45,875

Poquoson West, Va. (VIMS Map # **140**)

A3	43,268	I2	489,651	P1	596,044	W2	637,440
B4	44,526	J4	602,171	Q4	163,685	X1	135,310
C4	43,007	K2	42,242	R2	17,758	Y3	30,181
D1	100,118	L4	59,270	S3	26,561	Z2	14,626
E2	20,387	M1	17,218	T4	156,902	AA3	92,162
F2	69,406	N4	548,236	U2	1,573	BA2	4,046
G4	861,658	O2	399,852	V3	237,374	CA2	7,017
H1	377,096						

Density (1) 1,225,786 (2) 1,703,999 (3) 429,545 (4) 2,479,456 Total: 5,838,786

SAV

Poquoson East, Va. (VIMS Map # **141**)

A4	1,854,780	D4	5,574,896	G4	24,413	J4	8,724
B2	2,134,530	E2	603,607	H3	16,533	K2	1,309
C3	1,315,298	F2	22,519	I4	9,659		

Density (1) 0 (2) 2,761,966 (3) 1,331,832 (4) 7,472,472 Total: 11,566,269

Elliotts Creek, Va. (VIMS Map # **142**)

A1	110,488	B2	919,418

Density (1) 110,488 (2) 919,418 (3) 0 (4) 0 Total: 1,029,906

Hampton, Va. (VIMS Map # **147**)

A1	16,687	G4	49,077	M3	250,558	R1	14,367
B4	288,488	H4	451,275	N4	170,436	S3	61,050
C3	39,600	I2	102,410	O3	148,405	T1	15,538
D3	19,483	J1	309,451	P2	2,762	U1	43,949
E4	511,648	K3	98,433	Q4	104,369	V1	19,075
F2	643,181	L3	141,436				

Density (1) 419,067 (2) 748,353 (3) 758,965 (4) 1,575,292 Total: 3,501,677

Little Creek, Va. (VIMS Map # **151**)

A1	6,820	B4	33,223

Density (1) 6,820 (2) 0 (3) 0 (4) 33,223 Total: 40,043

Cape Henry, Va. (VIMS Map # **152**)

A1	1,776	C1	6,481	E1	35,951	G1	9,521
B1	1,553	D1	26,805	F2	5,554	H2	42,288

Density (1) 82,088 (2) 47,842 (3) 0 (4) 0 Total: 129,930

Bristol, Md. (VIMS Map # **159**)

A2	11,797	C4	134,724	E2	14,279	F2	2,065
B3	27,808	D2	20,389				

Density (1) 0 (2) 48,530 (3) 27,808 (4) 134,724 Total: 211,062

Charlotte Hall, Md. (VIMS Map # **162**)

A4 91,712

Density (1) 0 (2) 0 (3) 0 (4) 91,712 Total: 91,712

Assawoman Bay, Md.- Del. (VIMS Map # **166**)

A2	43,900	D2	29,535	F2	212,067	H2	84,646
B3	126,837	E1	610,544	G3	90,429	I1	110,018
C3	2,019						

Density (1) 720,563 (2) 370,148 (3) 219,286 (4) 0 Total: 1,309,996

Berlin, Md. (VIMS Map # **167**)

A1	16,008	B2	18,292	C3	44,693	D3	41,905

Density (1) 16,008 (2) 18,292 (3) 86,598 (4) 0 Total: 120,899

Ocean City, Md. (VIMS Map # **168**)

A2	35,451	C2	10,948	E2	6,964	G3	146,379
B2	60,610	D2	6,372	F2	12,998		

Density (1) 0 (2) 133,342 (3) 146,379 (4) 0 Total: 279,721

SAV

Tingles Island, Md. (VIMS Map # **170**)

A2	15,769	G2	505,058	M1	2,297	S2	311,532
B2	1,153,505	H1	102,905	N1	14,305	T2	2,398
C3	5,192,122	I3	1,900,877	O4	859,720	U3	78,929
D1	449,542	J1	100,172	P3	416,161	V2	2,461
E1	7,695	K1	35,411	Q3	222,725	W3	4,576
F2	24,987	L1	7,989	R2	53,917	X4	12,211

Density (1) 720,316 (2) 2,069,627 (3) 7,815,390 (4) 871,930 Total: 11,477,263

Boxiron, Md.- Va. (VIMS Map # **172**)

A2	152,523	D2	27,565	G1	374,898	J3	936,633
B2	1,024,788	E1	344,725	H2	1,411,679	K4	1,925,616
C2	129,659	F2	964,083	I3	171,936	L1	277,438

Density (1) 997,061 (2) 3,710,298 (3) 1,108,569 (4) 1,925,616 Total: 7,741,544

Whittington Point, Md.- Va. (VIMS Map # **173**)

A2	5,080	C2	39,413	E1	963,093	G2	214,461
B2	12,353	D2	819,545	F2	1,023,339	H1	1,033,308

Density (1) 1,996,401 (2) 2,114,190 (3) 0 (4) 0 Total: 4,110,591

Chincoteague West, Va. (VIMS Map # **174**)

AA3 360,166

Density (1) 0 (2) 0 (3) 360,166 (4) 0 Total: 360,166

Chincoteague East, Va. (VIMS Map # **175**)

A3	8,604,296	C2	462,335	E2	70,308	F2	39,903
B4	2,964,484	D3	41,397				

Density (1) 0 (2) 572,546 (3) 8,645,694 (4) 2,964,484 Total: 12,182,723

Anacostia, D.C.- Md. (VIMS Map # **176**)

A4 5,692

Density (1) 0 (2) 0 (3) 0 (4) 5,692 Total: 5,692

East of New Point Comfort, Va. (VIMS Map # **177**)

A4 22,624 B2 192,771

Density (1) 0 (2) 192,771 (3) 0 (4) 22,624 Total: 215,395

Bethel Beach, Va. (VIMS Map # **178**)

A1 19,701 B2 4,775 C2 11,360

Density (1) 19,701 (2) 16,135 (3) 0 (4) 0 Total: 35,835

Goose Island, Va. (VIMS Map # **179**)

A2 258,621 B4 1,221,636 C1 96,176

Density (1) 96,176 (2) 258,621 (3) 0 (4) 1,221,636 Total: 1,576,434

SAV

APPENDIX D

1995 Submerged Aquatic Vegetation Ground-Survey Data Listed by USGS 7.5 Minute Quadrangle and by 1995 Bed.

KEY

* Abbreviations under column "Species" are as follows:

Zm	-	*Zostera marina* (eelgrass)
Rm	-	*Ruppia maritima* (widgeon grass)
C	-	*Chara* sp. (muskgrass)
Cd	-	*Ceratophyllum demersum* (coontail)
Ec	-	*Elodea canadensis* (common elodea)
Ed	-	*Egeria densa* (water-weed)
Hd	-	*Heteranthera dubia* (water stargrass)
Hv	-	*Hydrilla verticillata* (hydrilla)
Ms	-	*Myriophyllum spicatum* (Eurasian watermilfoil)
N	-	*Najas* sp. (naiad)
Nfl	-	*Najas flexilis* (northern naiad)
Ngr	-	*Najas gracillima* (slender naiad)
Ngu	-	*Najas guadalupensis* (southern naiad)
Nm	-	*Najas minor* (no common name)
Nt	-	*Nitella* sp. (muskgrass)
Pcr	-	*Potamogeton crispus* (curly pondweed)
Pe	-	*Potamogeton epihydrus* (leafy pondweed)
Ppc	-	*Potamogeton pectinatus* (sago pondweed)
Ppf	-	*Potamogeton perfoliatus* (redhead-grass)
Ppu	-	*Potamogeton pusillus* (slender pondweed)
Tn	-	*Trapa natans* (water chestnut)
Va	-	*Vallisneria americana* (wild celery)
Zp	-	*Zannichellia palustris* (horned pondweed)
U	-	Unknown species composition

** Abbreviations under column "Surveyor" are as follows:

Citizen	-	Citizens' Survey
EPA	-	United States Environmental Protection Agency
Harford	-	Harford Community College
Ocean Pines	-	Ocean Pines Boat Club
PRP	-	Patuxent River Park Staff
USFWS	-	United States Fish and Wildlife Service
USGS	-	United States Geological Survey
VIMS	-	Virginia Institute of Marine Science

APPENDIX D

1995 Submerged AquaticVegetation Ground Survey Data Listed by USGS 7.5 Minute Quadrangle

Quad	1995 Bed	Species*	Surveyor**	Survey Date
002	D2	Hd, Hv, Ms, Va	Citizen	09/11/95
	E4	Hd, Ms, Va	Citizen	09/11/95
	B4	Hd, Hv, Ms, Va	Citizen	09/11/95
	A4	Hd, Hv, Ms	Citizen	09/11/95
	D2	Ms, Hv, Cd	Harford	09/20/95
003	Northeast River	Ms	Citizen	09/13/95
	A1	Ms, Va	Citizen	07/20/95
	A1	Ms	Harford	09/27/95, 09/30/95
	B1	Ms	Harford	09/27/95, 09/30/95
	C2	Ms, Va	Harford	09/27/95, 09/30/95
	D4	Ms, Hd, Hv, Va, Ngu	Harford	09/27/95, 09/30/95
	E4	Ms, Hd, Hv, Cd	Harford	09/27/95, 09/30/95
	F2	Ms, Va, Hd, Cd, Hv	Harford	09/27/95, 09/30/95
	F2	Hd, Hv, Ms, Va	Citizen	07/17/95
	G4	Ms, Hd, Cd, Hv	Harford	09/27/95, 09/30/95
	H4	Ms, Hd, Va, Cd, Hv	Harford	09/27/95, 09/30/95
	H4	Va	Harford	09/27/95, 09/30/95
	H4	Ms, Va, Hd, Hv	Harford	09/27/95, 09/30/95
	H4	Va, Ms	Harford	09/27/95, 09/30/95
	H4	Ms, Va, Hv, Hd	Harford	09/27/95, 09/30/95
	H4	Ms, Hv, Va, Hd	Harford	09/27/95, 09/30/95
	H4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	H4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	I4	Ms, Hv	Harford	09/27/95, 09/30/95
	J2	Hv, Ms	Citizen	09/11/95
	K2	Hd, Hv, Ms	Citizen	09/11/95
	K2	Ms, Hv	Harford	09/27/95, 09/30/95
	K2	Ms	Citizen	09/11/95
	L3	Ms, Hv	Harford	09/27/95, 09/30/95
	L3	Hv, Ms	Citizen	09/11/95
	M4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	M4	Ms	Citizen	09/11/95
	M4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	N4	Ms	Citizen	09/11/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
003	N4	Ms, Hv	Harford	09/27/95, 09/30/95
	O4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	O4	Hv, Ms	Citizen	09/11/95
	O4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	O4	Cd, Ms	Harford	09/27/95, 09/30/95
	N. of O4	Ms	Citizen	09/11/95
	P4	Ms	Citizen	09/11/95
	S4	Ms	Harford	09/27/95, 09/30/95
	S4	Ms	Citizen	09/11/95
	T4	Ms, Hv, Va, Cd, Ngu	Harford	09/27/95, 09/30/95
	T4	Hd, Ms	Citizen	09/11/95
	U3	Ms	Harford	09/27/95, 09/30/95
	U3	Ms	Citizen	09/11/95
	U3	Ms, Hv, Va, Cd, Ngu	Harford	09/27/95, 09/30/95
	W4	Ms, Hv, Hd	Harford	09/27/95, 09/30/95
	W4	Hd, Ms	Citizen	09/11/95
	X4	Ms, Hv, Cd, Hd	Harford	09/27/95, 09/30/95
	Y4	Ms, Hv	Harford	09/27/95, 09/30/95
	Y4	Ms, Hv	Citizen	10/22/95
	Y4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	Z4	Ms, Hv, Hd, Cd	Harford	09/27/95, 09/30/95
	Z4	Hd, Ms	Citizen	10/22/95
	AA4	Hd, Hv, Ms	Citizen	09/11/95
	BA4	Ms, Hv, Cd, Hd	Harford	09/27/95, 09/30/95
	BA4	Hv	Citizen	09/11/95
	CA4	Ms, Hv, Cd, Hd	Harford	09/27/95, 09/30/95
	CA4	Ms	Citizen	09/11/95
	DA4	Hd, Ms	Citizen	09/11/95
	DA4	Ms, Hv, Hd, Cd	Harford	09/27/95, 09/30/95
	EA3	Ms, Hv	Harford	09/27/95, 09/30/95
	FA3	Ms, Hv, Va, Cd, Ngu	Harford	09/27/95, 09/30/95
	FA3	Va, Hd, Hv	Citizen	10/22/95
	FA3	Ms	Citizen	09/11/95
	GA3	Va, Cd, Ngu	Harford	09/27/95, 09/30/95
	GA3	Va, Hd, Hv, Cd	Citizen	10/22/95
	GA3	Hd, Ms	Citizen	09/11/95
	HA4	Va, Ms, Hv, Cd	Citizen	10/22/95
	HA4	Hv, Ms, Va, Hd, Cd	Harford	09/27/95, 09/30/95
	HA4	Hv, Ms	Citizen	09/11/95
	IA4	Hv, Ms, Va	Citizen	09/11/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
003	IA4	Ms, Hv, Cd	Citizen	10/22/95
	IA4	Hv, Ms, Cd	Harford	09/27/95, 09/30/95
	JA4	Hv, Ms, Va	Citizen	09/11/95
	JA4	Ms, Hd, Hv, Va	Citizen	10/22/95
	JA4	Ms, Cd, Hv, Hd	Harford	09/27/95, 09/30/95
	KA4	Va, Hd, Hv	Citizen	10/22/95
	KA4	Va, Hv, Cd, Ms	Harford	09/27/95, 09/30/95
	LA4	Va, Hv, Ngu	Citizen	10/22/95
	LA4	Ms, Hv, Va, Hd, Cd	Harford	09/27/95, 09/30/95
	MA4	Va, Ms, Hd, Ngu	Citizen	10/22/95
	MA4	Ms, Va	Citizen	08/18/95
	MA4	Ms, Hv, Va, Hd, Cd	Harford	09/27/95, 09/30/95
	NA4	Hv, Ms, Va, Cd	Harford	09/27/95, 09/30/95
	NA4	Ms, Hv, Cd	Harford	09/27/95, 09/30/95
	OA4	Hv, Ms, Cd	Harford	09/27/95, 09/30/95
	OA4	Hv, Ms, Cd	Harford	09/27/95, 09/30/95
	PA3	Ms, Hv, Hd	Harford	09/27/95, 09/30/95
	PA3	Ms, Hv, Va, Hd, Cd	Harford	09/27/95, 09/30/95
	PA3	Ms, Hv, Hd, Va, Cd	Harford	09/27/95, 09/30/95
	PA3	Ms, Hv, Hd	Harford	09/27/95, 09/30/95
	PA3	Ms, Hv, Hd	Harford	09/27/95, 09/30/95
	RA4	Ms, Hv, Va	Harford	09/27/95, 09/30/95
	RA4	Ms, Hv, Hd, Va, Cd	Harford	09/27/95, 09/30/95
	SA1	Ms	Harford	09/27/95, 09/30/95
	TA1	Ms	Harford	09/27/95, 09/30/95
	TA1	Hv, Ms, Va	Citizen	07/17/95
004	Piney Creek Cove	Ms, Va	Citizen	07/20/95
	Piney Creek Cove	Ms, Va	Citizen	07/20/95
	Oldfield Point	Ms	Citizen	07/20/95
	B1	Ms	Harford	09/15/95
	C1	Ms	Harford	09/15/95
	D1	Ms	Harford	09/15/95
	F3	Ms, Va	Harford	09/15/95
	G1	Ms, Va	Harford	09/15/95
005	A2	Ms	Harford	09/15/95
	B1	Ms	Harford	09/15/96

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
007	Otter Point Creek	Cd, Pcr, Ec	Citizen	06/22/95
	Otter Point Creek	Ms, Pcr	Citizen	06/22/95
	Otter Point Creek	Ms	Citizen	06/22/95
	Otter Point Creek	Ms, Pcr	Citizen	06/22/95
	Otter Point Creek	Ms	Citizen	06/22/95
	Otter Point Creek	Pe, Ms, Pcr	Citizen	08/18/95
	Otter Point Creek	Pe, Va	Citizen	08/18/95
009	DA2	Ms, Cd, Va, Ppc, N	Harford	09/30/95
	DA2	Ms, Ppc	Harford	09/30/95
	DA2	Ms, Ppc	Harford	09/30/95
	DA2	Ms, Va	Harford	09/30/95
	Q2	Ms, Hv, Hd, Va, N	Harford	09/15/95
	S2	Ms, Hv	Harford	09/15/95
	R3	Ms, Hv, Cd	Harford	09/15/95
	C2	Ms, Hv, Cd	Harford	09/15/95
	B2	Ms, Hv, Cd	Harford	09/15/95
	N1	Ms	Harford	09/15/95
	O2	Ms, Hd, Cd, Va	Harford	09/15/95
	P3	Ms, Hd, Va, Cd, Ngu	Harford	09/15/95
	M1	Ms	Harford	09/15/95
	A3	Ms, Hd	Harford	09/15/95
010	A2	Ms, Cd, Va	Harford	09/30/95
	B2	Ms	Harford	09/30/95
	E2	Ms, Va	Harford	09/15/95
	F2	Ms, Va	Harford	09/15/95
	G2	Ms, Va	Harford	09/15/95
	G2	Ms, Va	Harford	09/15/95
	Q4	Va, Ms	Harford	09/15/95
	P1	Ms, Va	Harford	09/15/95
	O2	Va	Harford	09/15/95
	N2	Ms, Va, Ppc	Harford	09/15/95
	M2	Ms, Va	Harford	09/15/95
	L2	Ms, Va, Ppc	Harford	09/15/95
	K2	Ms, Va	Harford	09/15/95
	J2	Ms, Va	Harford	09/15/95
	I1	Ms, Va	Harford	09/15/95
	H1	Ms	Harford	09/15/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
014	Carroll Point	Ec, Va	Citizen	07/13/95
	F3	Ms, Ec, Va, Cd	Harford	10/11/95
	F3	Ec, Ms, Va	Harford	10/11/95
	F3	Ms, Ec	Harford	10/11/95
	G2	Ms, Ec	Harford	10/11/95
	H3	Ec, Ms, Cd	Harford	10/11/95
	I2	Ms, Ec, Va	Harford	10/11/95
	K3	Va, Ms, Ec	Harford	10/11/95
	M3	Va, Ms	Harford	10/11/95
	N1	Ec	Harford	10/11/95
	O2	Ec, Va, Ms	Harford	10/11/95
	P2	Ec	Harford	10/11/95
	Q2	Ms	Harford	10/11/95
	R2	Ec, Ms	Harford	10/11/95
	S2	Va, Ec, Ms	Harford	10/11/95
	T2	Ec	Harford	10/11/95
015	Worton Creek	Ms	Citizen	05/30/95
016	C3	Ms, Va	Harford	09/30/95
	D2	Ms, Va	Harford	09/30/95
	G2	Ms	Harford	09/30/95
	F1	Ms	Harford	09/30/95
017	H2	Ms	Harford	09/30/95
	B2	Ms	Harford	09/30/95
	A2	Ms	Harford	09/30/95
018	Mt. Pleasant Beach	Rm, Va, Zp	Citizen	06/07/95
019	Black Marsh	Cd	Citizen	08/10/95
023	Blackhole Creek	Zp, Ppc	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Mill Creek	Zp	USFWS	05/30/95
	Mill Creek	Zp	Citizen	06/02/95
	Mill Creek	Zp	USFWS	05/30/95
	Mill Creek	Zp	Citizen	06/02/95
	Mill Creek	Zp	USFWS	05/30/95
	Mill Creek	Zp	USFWS	05/30/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
023	Mill Creek	Zp	Citizen	06/02/95
	Mill Creek	Zp	USFWS	05/30/95
	Dividing Creek	Zp	USFWS	05/30/95
	Dividing Creek	Zp	USFWS	05/30/95
	Dividing Creek	Zp	USFWS	05/30/95
	Dividing Creek	Zp	USFWS	05/30/95
	Dividing Creek	Zp	Citizen	06/02/95
	Dividing Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	Citizen	06/02/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	Citizen	06/02/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp	USFWS	05/30/95
	Cypress Creek	Zp, Ms	USFWS	05/30/95
	Old Man Creek	Zp	USFWS	06/02/95
	Old Man Creek	Zp	USFWS	06/02/95
	Old Man Creek	Zp	USFWS	06/02/95
	Old Man Creek	Zp	Citizen	06/02/95
	Old Man Creek	Zp	USFWS	06/02/95
	Old Man Creek	Zp, Ppc	USFWS	06/02/95
	Magothy River	Zp	USFWS	06/02/95
	Beachwood Park	Zp	USFWS	06/02/95
	Beachwood Park	Zp	USFWS	06/02/95
	Beachwood Park	Zp	USFWS	06/02/95
	Magothy Bridge	Zp	Citizen	06/02/95
	Magothy Bridge	Zp	USFWS	06/02/95
	Magothy Bridge	Zp	USFWS	06/02/95
	Above bridge	Zp	USFWS	06/02/95
	Above bridge	Zp	USFWS	06/02/95
	Above bridge	Zp	USFWS	06/02/95
	Above bridge	Zp, N	USFWS	06/02/95
	Above bridge	Zp, N	USFWS	06/02/95
	Above bridge	Zp	USFWS	06/02/95
	Above bridge	Zp	USFWS	06/02/95
	Below bridge	Zp	USFWS	06/02/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
023	Beachwood Park	Zp	USFWS	06/02/95
	Beachwood Park	Zp	Citizen	06/02/95
	Beachwood Park	Zp	USFWS	06/02/95
	Beachwood Park	Zp	Citizen	06/02/95
	Beachwood Park	Zp	USFWS	06/02/95
	Magothy River	Zp	USFWS	06/02/95
	N. of Old Man Creek	Zp	USFWS	06/02/95
	S. of Old Man Creek	Zp	USFWS	06/02/95
	Cockey Creek	Zp	USFWS	06/02/95
	Cockey Creek	Zp	Citizen	06/02/95
	Cockey Creek	Zp	USFWS	06/02/95
	Cockey Creek	Zp	USFWS	06/02/95
	Cockey Creek	Zp	Citizen	06/02/95
	Cockey Creek	Zp	USFWS	06/02/95
	Cockey Creek	Zp	USFWS	06/02/95
	E. of Steedmans Point	Zp	Citizen	06/02/95
	Ross Cove	Zp	USFWS	06/02/95
	Ross Cove	Zp	USFWS	06/02/95
	Pea Patch Point	Zp	USFWS	06/02/95
	R2	Zp	USFWS	06/02/95
	R2	Zp	USFWS	06/02/95
	Henderson Point	Zp	Citizen	06/02/95
	Henderson Point	Zp, Rm	USFWS	06/02/95
	Henderson Point	Rm	USFWS	07/23/95
	Mouth Cattail Creek	Zp	USFWS	06/02/95
	Mouth Cattail Creek	Zp	USFWS	06/02/95
	Whitehurst	Zp	Citizen	06/02/95
	Cattail Creek	Zp	USFWS	06/02/95
	Cattail Creek	Zp	Citizen	06/02/95
	Cattail Creek	Zp	USFWS	06/02/95
	Cattail Creek	Zp	USFWS	06/02/95
	Joyce	Rm, Zp	Citizen	06/09/95
	A4	Rm, Zp	Citizen	07/03/95
	B2	Rm, Zp	Citizen	07/03/95
	C4	Ppf, Zp	Citizen	07/03/95
	D1	Ppf, Zp	Citizen	07/03/95
	E4	Ppf, Zp	Citizen	07/03/95
	F2	Rm, Zp	Citizen	07/03/95
	G1	Zp	Citizen	07/03/95
	H3	Zp	Citizen	07/03/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
023	I2	Rm, Zp	Citizen	06/30/95
	Herald Harbour	Zp	Citizen	06/30/95
	I2	Zp	Citizen	06/30/95
	K2	Zp	Citizen	06/30/95
	St. Helena Island	Zp	Citizen	06/30/95
	Mayneider Creek	Zp	Citizen	07/03/95
	Brewer Pond	Rm, Zp	Citizen	07/03/95
	P3	Zp	Citizen	07/03/95
	Brewer Creek	Rm, Zp	Citizen	07/03/95
	Brewer Creek	Zp	Citizen	07/03/95
	Brewer Creek	Ppf	Citizen	07/03/95
	Clements Creek	Rm, Zp	Citizen	07/03/95
	E4	Rm	USFWS	08/04/95
	D1	Rm	USFWS	08/04/95
	C4	Rm	USFWS	08/04/95
	M3	Rm	USFWS	08/04/95
	N4	Rm, Ppf	USFWS	08/04/95
024	Grays Creek	Zp	USFWS	05/30/95
	Cornfield Creek	Rm, Zp	USFWS	05/30/95
	Cornfield Creek	Ppf, Rm	USFWS	07/23/95
	Stonington	Zp, Ppf	USFWS	05/30/95
	A3	Ppc, Ppf, Zp	USFWS	05/26/95
	Schneide's Cove	Zp	USFWS	05/30/95
	Schneide's Cove	Zp	USFWS	05/30/95
	Adams Point	Ppc, Zp	USFWS	05/26/95
	B2	Ppc	USFWS	05/30/95
	Forked Creek	Ppc, Zp	USFWS	05/30/95
	Forked Creek	Rm, Zp	USFWS	05/18/95
	Cool Spring Cove	Rm, Zp	USFWS	05/18/95
	Broad Creek	Rm	USFWS	05/30/95
	Broad Creek	Zp	USFWS	05/30/95
	Broad Creek	Zp	USFWS	05/30/95
	Broad Creek	Zp	USFWS	05/30/95
	Broad Creek	Zp	USFWS	05/30/95
	Broad Creek	Zp	USFWS	05/30/95
	E. of Park Point	Zp	USFWS	05/26/95
	Blackhole Creek	Ppc	USFWS	05/30/95
	Blackhole Creek	Zp, Ppc	USFWS	05/30/95
	Blackhole Creek	Zp, Ppc	USFWS	05/30/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
024	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Ppc, Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Blackhole Creek	Zp	USFWS	05/30/95
	Little Island	Zp, Ppc	USFWS	05/30/95
	D3	Ppc, Zp	USFWS	05/26/95
	C3	Ppc, Zp	USFWS	05/26/95
	G2	Ppf	USFWS	07/23/95
	L3	Rm	USFWS	07/23/95
	N4	Ppf	USFWS	07/23/95
	N4	Ppf, Zp	USFWS	05/26/95
028	I4	Hv, Va	Citizen	08/02/95
	G4	Hv	Citizen	08/02/95
	H4	Hv	Citizen	08/02/95
	G4	Hv	Citizen	08/02/95
	Potomac River	U	Citizen	08/02/95
	B4	Cd, Hv, N, Va	Citizen	07/19/95
	Potomac River	Hv	Citizen	07/19/95
	Georgetown Resevoir	Hv	Citizen	07/19/95
	C4	Cd, Hv, N, Va	Citizen	07/19/95
	D4	Cd, Hv, N	Citizen	07/19/95
	E4	Hv	Citizen	07/19/95
	J4	Hv	Citizen	07/19/95
	J4	Hv	Citizen	07/19/95
	K4	Hv	Citizen	07/19/95
	F4	Hv	Citizen	07/19/95
	I4	Hv	Citizen	07/19/95
	E4	Hv	USGS	Fall 1995
	D4	Hv	USGS	Fall 1995
	I4	Hv, Hd	USGS	Fall 1995
	K4	Hv	USGS	Fall 1995
	I4	Hv, Hd	USGS	Fall 1995
	Boundary Channel	Hv	USGS	Fall 1995

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
029	A3	Hv	USGS	Fall 1995
	Anacostia River	Hv	USGS	Fall 1995
	Anacostia River	Hv	USGS	Fall 1995
030	Bacon Ridge Branch	Zp	Citizen	Spring 95
	Arundel Ridge	Zp	Citizen	Spring 95
	South River	Zp	Citizen	Spring 95
	South River	Zp	Citizen	Spring 95
	Bon Haven	Zp	Citizen	Spring 95
	Flat Creek	Zp	Citizen	Spring 95
	Flat Creek	Zp	Citizen	Spring 95
	Broad Creek	Zp	Citizen	Spring 95
	Broad Creek	Zp	Citizen	Spring 95
	Broad Creek	Zp	Citizen	Spring 95
	Beards Point	Zp	Citizen	Spring 95
	Granville Creek	Zp	Citizen	Spring 95
	Riva	Zp	Citizen	Spring 95
	Hardestys Cove	Zp	Citizen	Spring 95
	Beards Creek	Zp	Citizen	Spring 95
	Beards Creek	Zp	Citizen	Spring 95
	Beards Creek	Zp	Citizen	Spring 95
	Beards Creek	Zp	Citizen	Spring 95
	Beards Creek	Zp	Citizen	Spring 95
	South Down Shores	Zp	Citizen	Spring 95
	Cedar Point	Zp	Citizen	Spring 95
	Warehouse Creek	Zp	Citizen	Spring 95
	Almshouse Creek	Zp	Citizen	Spring 95
	County Home	Rm, Zp	Citizen	Spring 95
	Glebe Bay	Zp	Citizen	Spring 95
	Glebe Creek	Zp	Citizen	Spring 95
	Glebe Creek	Zp	Citizen	Spring 95
	Glebe Bay	Zp	Citizen	Spring 95
	Cedar Point	Rm	Citizen	Spring 95
	A2	Rm, Zp	Citizen	Spring 95
	Larkington Cove	Zp	Citizen	Spring 95
	Pocahontas Creek	Zp	Citizen	Spring 95
	Brewer Creek	Zp	Citizen	Spring 95
	Limehouse Cove	Zp	Citizen	Spring 95
	Mayo Point	Rm	Citizen	Spring 95
	Long Point	Rm	Citizen	Spring 95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
030	Selby Bay	Zp	Citizen	Spring 95
	Selby Bay	Zp	Citizen	Spring 95
	Selby Bay	Zp	Citizen	Spring 95
	Selby Bay	Rm, Zp	Citizen	Spring 95
	Selby Bay	Zp	Citizen	Spring 95
	Turkey Point	Zp	Citizen	Spring 95
	Ramsay Lake	Ppu, Zp	Citizen	Spring 95
	Ramsay Lake	Ppu, Zp	Citizen	Spring 95
	Pooles Gut	Ppu, Zp	Citizen	Spring 95
	Cadle Creek	Zp	Citizen	Spring 95
	Cadle Creek	Zp	Citizen	Spring 95
	Rhode River	Rm	Citizen	Spring 95
	Whitemarsh Creek	Zp	Citizen	Spring 95
	Whitemarsh Creek	Zp	Citizen	Spring 95
	Bear Neck Creek	Zp	Citizen	Spring 95
	Sellman Creek	Zp	Citizen	Spring 95
	Sellman Creek	Zp	Citizen	Spring 95
	Sheephead Cove	Zp	Citizen	Spring 95
	Fox Creek	Zp	Citizen	Spring 95
	Muddy Creek	Zp	Citizen	Spring 95
	Boathouse Creek	Zp	Citizen	Spring 95
	Murray Wharf	Zp	Citizen	Spring 95
	Locust Point	Zp	Citizen	Spring 95
	Pig Pond	Rm, Zp	Citizen	Spring 95
	London Pond	Rm, Zp	Citizen	Spring 95
	Harness Creek	Zp	Citizen	Spring 95
	Harness Creek	Zp	Citizen	Spring 95
	Aberdeen Creek	Zp	Citizen	Spring 95
	Aberdeen Creek	Rm	Citizen	Spring 95
	Crab Creek	Pcr, Zp	Citizen	Spring 95
	Crab Creek	Pcr, Zp	Citizen	Spring 95
	Church Creek	Zp	Citizen	Spring 95
	Church Creek	Zp	Citizen	Spring 95
	Gingerville Creek	Zp	Citizen	Spring 95
	Boyd Point	Zp	Citizen	Spring 95
	Weems Creek	Zp	Citizen	Spring 95
	College Creek	Rm	Citizen	Spring 95
	Weems Creek	Zp	Citizen	May-Aug. 95
	Weems Creek	Zp	Citizen	May-Aug. 95
	Back Ridge Branch	Rm	Citizen	Aug. 95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
030	South River	Rm	Citizen	Aug. 95
	Flat Creek	Rm	Citizen	Aug. 95
	Bon Haven	Rm	Citizen	Aug. 95
	Hambleton	Rm	Citizen	Aug. 95
	Broad Creek	Rm	Citizen	Aug. 95
	Boyd Point	Rm	Citizen	Aug. 95
	Gingerville Creek	Rm	Citizen	Aug. 95
	Beards Creek	Rm	Citizen	Aug. 95
	Beards Creek	Rm	Citizen	Aug. 95
	Edgewater Beach	Rm	Citizen	Aug. 95
	Warehouse Creek	Rm	Citizen	Aug. 95
	Almhouse Creek	Rm	Citizen	Aug. 95
	Church Creek	Rm	Citizen	Aug. 95
	Crab Creek	Rm	Citizen	Aug. 95
	Wild Rose Shores	Rm	Citizen	Aug. 95
	Aberdeen Creek	Zp	Citizen	Aug. 95
	Aberdeen Creek	Rm	Citizen	Aug. 95
	Harness Creek	Rm	Citizen	Aug. 95
	London Pond	Rm	Citizen	Aug. 95
	N. of Hill Point	Rm	Citizen	Aug. 95
	N. of Larrimore Point	Zp	Citizen	Aug. 95
	Larrimore Point	Zp	Citizen	Aug. 95
	Glebe Creek	Rm	Citizen	Aug. 95
	Glebe Heights	Rm	Citizen	Aug. 95
	Glebe Bay	Rm	Citizen	Aug. 95
	Cedar Point	Zp	Citizen	Aug. 95
	Brewer Creek	Rm	Citizen	Aug. 95
	Limehouse Cove	Rm	Citizen	Aug. 95
	Mayo Point	Zp	Citizen	Aug. 95
	Long Point	Zp	Citizen	Aug. 95
	Selby Bay	Zp	Citizen	Aug. 95
	Selby Bay	Rm	Citizen	Aug. 95
	Selby Bay	Zp	Citizen	Aug. 95
	Selby Bay	Rm	Citizen	Aug. 95
	Turkey Point	Zp	Citizen	Aug. 95
	Little Island	Rm	Citizen	Aug. 95
	Harbor View	Rm	Citizen	Aug. 95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
031	College Creek	Rm, Zp	Citizen	07/03/95
	College Creek	Ppf	Citizen	07/03/95
	Lake Ogleton	Ppu, Zp	Citizen	06/16/95
033	N2	Rm	Citizen	07/15/95
034	QA4	Hv, Nm	USGS	Fall 1995
	QA4	Hv	USGS	Fall 1995
	Potomac River	Hv	USGS	Fall 1995
	NA3	Hv	USGS	Fall 1995
	Potomac River	Hv	USGS	Fall 1995
	MA2	Hv, Va	USGS	Fall 1995
	HA3	Va, Hv, Ppc, Nm	USGS	Fall 1995
	GA2	Hv, Va, Hd	USGS	Fall 1995
	GA2	Hv, Va	USGS	Fall 1995
	GA2	Va, Hv, Cd	USGS	Fall 1995
	GA2	Hd, Va	USGS	Fall 1995
	FA4	Va, Ms, Hd	USGS	Fall 1995
	FA4	Hv, Va, Cd, Hd, Ms, Nm	USGS	Fall 1995
	Washington Sail Marina	Hv, Va	USGS	Fall 1995
	BA4	Hv	USGS	Fall 1995
	Z4	Hv	USGS	Fall 1995
	Z4	Hv, Va, Cd, Ms	USGS	Fall 1995
	Z4	Va, Ms, Hd, Hv	USGS	Fall 1995
	Z4	Nm, Ms, Hd, Hv	USGS	Fall 1995
	Z4	Va, Hd, Ms, Hv	USGS	Fall 1995
	Z4	Hv, Va, Ms, Hd, Cd	USGS	Fall 1995
	Z4	Hv, Va, Hd	USGS	Fall 1995
	Z4	Hv	USGS	Fall 1995
	Y4	Hv, Hd, Cd	USGS	Fall 1995
	Potomac River	Hv, Hd	USGS	Fall 1995
	Washington Channel	Cd, Va, Ms, Hv	USGS	Fall 1995
	X4	Cd, Va, Ms, Hv	USGS	Fall 1995
	W4	Hv, Ms, Cd, Va	USGS	Fall 1995
	V3	Ms, Hv, Cd, Va	USGS	Fall 1995
	U4	Hv, Cd, Ms, Hd	USGS	Fall 1995
	T3	Hv, Cd	USGS	Fall 1995
	Potomac River	Hd, Ms	USGS	Fall 1995
	S3	Va	USGS	Fall 1995
	S3	Va	USGS	Fall 1995

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
034	S3	Va, Ms, Hv	USGS	Fall 1995
	Potomac River	Hv	USGS	Fall 1995
	R2	Va, Hd, Ms	USGS	Fall 1995
	R2	Va, Ms, Hd, Hv	USGS	Fall 1995
	R2	Va, Ms, Hd, Hv	USGS	Fall 1995
	Q4	Ms, Va, Hv, Cd	USGS	Fall 1995
	Q4	Hv, Va, Ms, Nm	USGS	Fall 1995
	Q4	Va, Hv, Ms	USGS	Fall 1995
	L4	Hv, Ms, Hd, Nm	USGS	Fall 1995
	L4	Hv, Cd, Hd	USGS	Fall 1995
	L4	Hv, Cd, Hd	USGS	Fall 1995
	K4	Hv, Cd, Hd	USGS	Fall 1995
	Potomac River	Hv, Va, Nm	USGS	Fall 1995
	Potomac River	Hv, Va	USGS	Fall 1995
	F4	Hv	USGS	Fall 1995
	Potomac River	Va, Hv, Ms, Cd, Hd	USGS	Fall 1995
	J4	Hv, Ms, Hd	USGS	Fall 1995
	H1	Hv, Va	USGS	Fall 1995
	H1	Hv, Va	USGS	Fall 1995
	E2	Ms, Hv, Cd	USGS	Fall 1995
	D4	Hv, Cd	USGS	Fall 1995
	D4	Ms, Hv, Va, Cd, Hd	USGS	Fall 1995
035	Johns Creek	Rm	Citizen	09/11/95
037	Broad Creek	Rm	Citizen	09/03/95
	K2	Rm	Citizen	09/03/95
	J4	Rm	Citizen	09/03/95
039	Boat Ramp	Hv	Citizen	08/13/95
	G4	Cd, Hv, N	Citizen	08/13/95
	F3	Hv, Ms, N, Va	Citizen	08/13/95
	E2	Hv, Ms, Va	Citizen	08/13/95
	S. of D4	Hv, Ms, Va	Citizen	08/13/95
	D4	Hv, Ms, N, Va	Citizen	08/13/95
	E. of D4	Hv, Ms, Va	Citizen	08/13/95
	Occoquan River	Ms, Nm, Hv	USGS	Fall 1995
	Occoquan River	Ms, Nm, Hv	USGS	Fall 1995
	Occoquan River	Ms	USGS	Fall 1995
	Occoquan River	Ms	USGS	Fall 1995

Quad	1995 Bed	Species*	Surveyor**	Survey Date
039	Woodbridge	Ms, Hv	USGS	Fall 1995
	A3	Ms, Hv	USGS	Fall 1995
	Occoquan River	Ms	USGS	Fall 1995
	Occoquan River	Ms	USGS	Fall 1995
	Occoquan River	Ms	USGS	Fall 1995
	Belmont Bay	Ms	USGS	Fall 1995
	C4	Ms, Hv, Va, Nm	USGS	Fall 1995
	Belmont Bay	Ms, Hv, Va, Nm	USGS	Fall 1995
	Belmont Bay	Va, Ms	USGS	Fall 1995
	Belmont Bay	Hv, Ms	USGS	Fall 1995
	Belmont Bay	Hv, Ms	USGS	Fall 1995
	Kanes Creek	Hv	USGS	Fall 1995
	Belmont Bay	Hv	USGS	Fall 1995
	Belmont Bay	Ms	USGS	Fall 1995
	D4	Cd,Va,Pcr,Nm,Hv, Ms	USGS	Fall 1995
	D4	Cd,Va,Pcr,Nm,Hv, Ms	USGS	Fall 1995
	Potomac River	Va, Hv, Nm	USGS	Fall 1995
	E2	Va, Hv, Ms, Nm	USGS	Fall 1995
	E2	Va, Nm, Hv	USGS	Fall 1995
	E2	Va, Nm, Hv	USGS	Fall 1995
	Potomac River	Va, Ms, Hv	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va	USGS	Fall 1995
	F3	Va	USGS	Fall 1995
	F3	Va	USGS	Fall 1995
	F3	Va, Ms, Hv	USGS	Fall 1995
	F3	Va	USGS	Fall 1995
	F3	Va, Hv, Nm	USGS	Fall 1995
	F3	Va, Hv, Nm	USGS	Fall 1995
	Gunston Cove	Va	USGS	Fall 1995
	G4	Hv, Cd	USGS	Fall 1995
	G4	Hv, Cd, Nm	USGS	Fall 1995
	H4	Hv, Cd, Nm	USGS	Fall 1995
	Gunston Cove	Va	USGS	Fall 1995
	Gunston Cove	Hv, Va, Nm	USGS	Fall 1995
	Gunston Cove	Hv, Va, Nm, Ms	USGS	Fall 1995

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
039	I3	Hv, Va, Ngu	USGS	Fall 1995
	Gunston Cove	Hv, Ms, Va, Nm	USGS	Fall 1995
	Gunston Cove	Ms, Va, Hv, Nm	USGS	Fall 1995
	K4	Hv, Va, Nm, Ngu	USGS	Fall 1995
	K4	Va	USGS	Fall 1995
	K4	Va	USGS	Fall 1995
040	A4	Cd, Hv, Va	Citizen	08/26/95
	B4	Cd, Hv, Va	Citizen	08/26/95
	C4	Cd, Hv, Va	Citizen	08/26/95
	D4	Hv, Ms, Va	Citizen	08/26/95
	E2	Hv, Ms, Va	Citizen	08/26/95
	F2	Hv, Ms, Va	Citizen	08/26/95
	U4	Hv, Va	Citizen	07/30/95
	Park	U	Citizen	07/30/95
	W4	Cd, Hv, N, Va	Citizen	08/13/95
	A4	Hv, Nm, Va	USGS	Fall 1995
	D4	Hv, Va, Nm	USGS	Fall 1995
	Potomac River	Hv, Ms, Cd, Nm	USGS	Fall 1995
	Potomac River	Va, Hv	USGS	Fall 1995
	E2	Va, Hv	USGS	Fall 1995
	E2	Va, Hv	USGS	Fall 1995
	E2	Va	USGS	Fall 1995
	E2	Va, Ms	USGS	Fall 1995
	E2	Va, Ms	USGS	Fall 1995
	F2	Va, Hv, Ms	USGS	Fall 1995
	F2	Va, Hv, Ms	USGS	Fall 1995
	F2	Va, Hv, Ms	USGS	Fall 1995
	Potomac River	Va, Hv, Ms	USGS	Fall 1995
	Potomac River	Va, Hv, Ms	USGS	Fall 1995
	G4	Nm, Hv	USGS	Fall 1995
	G4	Hv, Nm, Cd	USGS	Fall 1995
	Potomac River	Va	USGS	Fall 1995
	Potomac River	Hv, Ms, Nm	USGS	Fall 1995
	I4	Hv, Va, Nm, Ms	USGS	Fall 1995
	I4	Hv, Va, Nm	USGS	Fall 1995
	J2	Hv, Nm, Cd	USGS	Fall 1995
	K4	Hv, Va	USGS	Fall 1995
	Piscataway Creek	Hv	USGS	Fall 1995
	Piscataway Creek	Hv, Nm	USGS	Fall 1995

Quad	1995 Bed	Species*	Surveyor**	Survey Date
040	Piscataway Creek	Hv	USGS	Fall 1995
	N4	Hv	USGS	Fall 1995
	O2	Va, Hv	USGS	Fall 1995
	P3	Va, Hv	USGS	Fall 1995
	Q3	Hv	USGS	Fall 1995
	R4	Hv, Nm	USGS	Fall 1995
	S2	Hv, Va, Cd	USGS	Fall 1995
	Broad Creek	Ms, Cd	USGS	Fall 1995
	Broad Creek	Hv, Cd, Nm	USGS	Fall 1995
	V2	Va	USGS	Fall 1995
	W4	Nm, Va, Hv	USGS	Fall 1995
	W4	Hv, Nm, Va	USGS	Fall 1995
	W4	Hv, Nm	USGS	Fall 1995
	W4	Hv, Nm	USGS	Fall 1995
041	Tanyard Branch	Ngr	PRP	06/30/95
	Hall Creek	Ngu, Cd, Ppu, Ec, Va	PRP	06/30/95
	D3	Ngr	PRP	06/30/95
	Lyons Creek	Ec, Nm, Cd	PRP	06/30/95
	Mattaponi Creek	Ngr, Cd, Ec, Nm, Pcr	PRP	06/30/95
	Cocktown Creek	Va, Cd, Ngr, Pcr, Ec	PRP	08/22/95
	Black Swamp Creek	Ec, Cd, Pcr, Ngr	PRP	08/22/95
043	I2	Rm	Citizen	06/30/95
044	Boone Creek	Zp	Citizen	09/01/95
	Foxhole Creek	Ppc	Citizen	06/15/95
	L3	U	Citizen	06/15/95
	N3	U	Citizen	06/15/95
	R2	U	Citizen	06/15/95
	M1	U	Citizen	06/15/95
	Irish Creek	U	Citizen	06/15/95
	Irish Creek	U	Citizen	06/15/95
	Irish Creek	U	Citizen	06/15/95
	O3	U	Citizen	06/15/95
	Irish Creek	U	Citizen	06/15/95
	Irish Creek	U	Citizen	06/15/95
	P3	U	Citizen	06/15/95
	Foxhole Creek	Rm	Citizen	05/26/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
047	A4	Hv, Cd, Ms, Nm, Va	USGS	Fall 1995
	A4	Hv, Cd, Ms, Nm, Va	USGS	Fall 1995
	A4	Hv, Cd	USGS	Fall 1995
	B4	Hv, Ms, Cd	USGS	Fall 1995
	B4	Hv, Ms, Cd	USGS	Fall 1995
	B4	Hv, Ms, Va, Cd	USGS	Fall 1995
	B4	Hv, Ms, Va, Cd	USGS	Fall 1995
	C4	Hv	USGS	Fall 1995
	C4	Hv, Cd, Nm	USGS	Fall 1995
	C4	Hv, Cd, Nm	USGS	Fall 1995
	D4	Hv, Ms, Nm, Cd	USGS	Fall 1995
	D4	Ms	USGS	Fall 1995
	D4	Hv, Ms, Nm, Cd	USGS	Fall 1995
	D4	Ms, Cd	USGS	Fall 1995
	Potomac River	Hv, Ms, Cd	USGS	Fall 1995
	E4	Hv, Ms, Cd	USGS	Fall 1995
	E4	Ms, Cd	USGS	Fall 1995
	E4	Ms, Cd	USGS	Fall 1995
	E4	Hv, Va	USGS	Fall 1995
	F4	Hv, Va, Nm	USGS	Fall 1995
	Quantico Creek	Va, Hv	USGS	Fall 1995
	K2	Va, Hv	USGS	Fall 1995
	L4	Ms, Hv	USGS	Fall 1995
	L4	Hv, Cd, Ms	USGS	Fall 1995
	Potomac River	Va, Ms, Hv	USGS	Fall 1995
	Potomac River	Hv, Ms, Nm, Va, Cd	USGS	Fall 1995
	N4	Hv	USGS	Fall 1995
	N4	Hv, Nm	USGS	Fall 1995
	Potomac River	Ms	USGS	Fall 1995
048	H4	Hv, Cd, Ms, Nm, Va	USGS	Fall 1995
	H4	Hv, Cd, Ms, Nm	USGS	Fall 1995
	H4	Hv, Cd, Ms, Nm	USGS	Fall 1995
	H4	Hv, Nm	USGS	Fall 1995
	H4	Hv, Nm	USGS	Fall 1995
	H4	Hv, Nm	USGS	Fall 1995
	H4	Hv, Nm	USGS	Fall 1995
	H4	Hv, Nm	USGS	Fall 1995
	H4	Hv, Cd, Ms, Nm	USGS	Fall 1995
	H4	Hv, Cd, Ms, Nm	USGS	Fall 1995

Quad	1995 Bed	Species*	Surveyor**	Survey Date
048	Stump Neck	Va, Ms	USGS	Fall 1995
	Stump Neck	Ms, Hv	USGS	Fall 1995
	Stump Neck	Hv	USGS	Fall 1995
	Mattawoman Creek	Ms, Va	USGS	Fall 1995
	Mattawoman Creek	Va	USGS	Fall 1995
	F3	Hv, Nm	USGS	Fall 1995
	E3	Hv, Nm, Va	USGS	Fall 1995
	Grinders Wharf	Va	USGS	Fall 1995
	Bullocks Neck	Va	USGS	Fall 1995
	Thorofare Island	Hv, Nm	USGS	Fall 1995
	N. of Thorofare Island	Hv, Nm	USGS	Fall 1995
	off of Hogg Island	Hv, Nm	USGS	Fall 1995
	off of Hogg Island	Hv, Nm	USGS	Fall 1995
	W. of Hogg Island	Hv, Nm	USGS	Fall 1995
	Cornwallis Neck	Hv, Nm	USGS	Fall 1995
	Cornwallis Neck	Hv, Nm	USGS	Fall 1995
	C4	Hv, Nm	USGS	Fall 1995
	Cornwallis Neck	Hv, Nm, Ms	USGS	Fall 1995
	Deep Point	Hv, Ms, Nm	USGS	Fall 1995
	Potomac River	Ms	USGS	Fall 1995
	Potomac River	Ms	USGS	Fall 1995
	A3	Va	USGS	Fall 1995
	Potomac River	Ms, Hv	USGS	Fall 1995
	Potomac River	Va, Ms, Nm	USGS	Fall 1995
	Potomac River	Va	USGS	Fall 1995
	Potomac River	Hv, Va, Ms, Nm, Hd	USGS	Fall 1995
	Potomac River	Ms	USGS	Fall 1995
	Potomac River	Ms	USGS	Fall 1995
049	Deep Landing	Cd, Ec, N, Pcr, U	Citizen	07/11/95
	Hunting Creek	Cd, Pcr, Ppu	PRP	08/22/95
	Swanson Creek	Ec, U	PRP	08/22/95
051	Brannock Bay	Rm	Citizen	06/03/95
	G3	Rm	Citizen	06/03/95
	E2	Rm	Citizen	06/03/95
	D4	Rm	Citizen	06/03/95
	E2	Rm	Citizen	06/03/95
	F1	Rm	Citizen	06/03/95
	H1	U	Citizen	06/09/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
051	D4	U	Citizen	06/09/95
	Hills Point	U	Citizen	06/09/95
052	Back Creek	Zp	Citizen	Spring 95
	Back Creek	Zp	Citizen	Spring 95
055	Potomac River	Va	USGS	Fall 1995
	A4	Va	USGS	Fall 1995
	A4	Va	USGS	Fall 1995
	Potomac River	Va	USGS	Fall 1995
	B2	Ms, Va	USGS	Fall 1995
	C4	Ms, Va, Cd	USGS	Fall 1995
	C4	Ms, Va, Cd	USGS	Fall 1995
	C4	Ms, Hv, Cd, Va	USGS	Fall 1995
	D4	Hv	USGS	Fall 1995
	D4	Hv	USGS	Fall 1995
	E4	Hv, Ms, Va	USGS	Fall 1995
	E4	Hv, Ms, Cd	USGS	Fall 1995
	F1	Ms, Hv	USGS	Fall 1995
	F1	Hv	USGS	Fall 1995
	G4	Hv, Ms	USGS	Fall 1995
	G4	Hv, Ms	USGS	Fall 1995
	Potomac River	Ms, Hv	USGS	Fall 1995
	H4	Hv, Ms, Nm	USGS	Fall 1995
	H4	Hv, Ms, Nm	USGS	Fall 1995
	J4	Hv, Va	USGS	Fall 1995
	K4	Ms	USGS	Fall 1995
	K4	Ms	USGS	Fall 1995
	L2	Ms, Va	USGS	Fall 1995
	K4	Hv, Ms, Cd, Nm	USGS	Fall 1995
	K4	Hv, Ms	USGS	Fall 1995
	K4	Hv, Ms	USGS	Fall 1995
	K4	Hv, Va	USGS	Fall 1995
	K4	Hv, Ms, Va, Nm	USGS	Fall 1995
	K4	Hv, Ms, Nm	USGS	Fall 1995
	L2	Va, Ms, Hv, Nm, Cd	USGS	Fall 1995
	L2	Va, Hv, Ms, Nm	USGS	Fall 1995
	L2	Hv, Ms, Va, Nm	USGS	Fall 1995
	Aquia Creek	Ms	USGS	Fall 1995
	N4	Hv, Ms, Nm	USGS	Fall 1995

Quad	1995 Bed	Species*	Surveyor**	Survey Date
055	O4	Hv	USGS	Fall 1995
	O4	Hv	USGS	Fall 1995
	O4	Hv	USGS	Fall 1995
	P4	Hv	USGS	Fall 1995
	P4	Hv	USGS	Fall 1995
	Aquia Creek	Hv	USGS	Fall 1995
	Aquia Creek	Hv	USGS	Fall 1995
	Aquia Creek	Hv, Ms	USGS	Fall 1995
	Aquia Creek	Ms	USGS	Fall 1995
	Aquia Creek	Ms, Hv	USGS	Fall 1995
	Q2	Ms	USGS	Fall 1995
	Q2	Hv, Va	USGS	Fall 1995
	R4	Hv, Nm, Cd	USGS	Fall 1995
	S3	Hv,Ms,Va,Cd,Nm,Hd	USGS	Fall 1995
	S3	Ms, Cd	USGS	Fall 1995
	Aquia Creek	Cd, Hv, Ms	USGS	Fall 1995
	Aquia Creek	Ms, Cd	USGS	Fall 1995
056	A4	Va	USGS	July 1995
	A4	Ppf	USGS	July 1995
057	B4	Va, Ppf, Ppc	USGS	July 1995
	D4	Va, Ppf	USGS	July 1995
	D4	Va, Ppf	USGS	July 1995
	E2	Va, Ppf	USGS	July 1995
	E2	Va, Ppf	USGS	July 1995
	E2	Va, Ppc	USGS	July 1995
	F4	Va, Ppc	USGS	July 1995
	F4	Ppf, Va, Ppc	USGS	July 1995
	G4	Va	USGS	July 1995
	H4	Va	USGS	July 1995
	H4	Va	USGS	July 1995
	H4	Ppf, Ppc, Va	USGS	July 1995
	J4	Va	USGS	July 1995
	L4	Ppc	USGS	July 1995
	L4	Va, Ppc, Ppf	USGS	July 1995
	Nanjemoy Creek	Va	USGS	July 1995
	Q2	Va	USGS	July 1995
	X4	Va, Ppc	USGS	July 1995
	AA4	Va, Ppc	USGS	July 1995

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
057	BA4	Va, Ppf, Ppc	USGS	July 1995
058	Potomac River	Rm	USGS	July-Aug. 95
060	Battle Creek	Zp	Citizen	Spring 95
	Long Cove	Zp	Citizen	Spring 95
061	Grapevine Cove	Zp	Citizen	Spring 95
	Osborn Cove	Zp	EPA	Feb.-June 95
064	Potomac Creek	Ms, Nm	USGS	Fall 1995
	Potomac Creek	Ms, Va	USGS	Fall 1995
	Potomac Creek	Hv, Ms, Cd, Ngu	USGS	Fall 1995
	Potomac Creek	Ms, Cd	USGS	Fall 1995
	Potomac Creek	Ms, Cd	USGS	Fall 1995
	C3	Hv, Ms, Cd, Nm	USGS	Fall 1995
	Potomac Creek	Hv, Va, Nm	USGS	Fall 1995
	B4	Hv, Ms, Nm	USGS	Fall 1995
	Potomac Creek	Ms	USGS	Fall 1995
	B4	Hv, Nm, Ngu, Ms, Va	USGS	Fall 1995
	A1	Hv, Va, Ms	USGS	Fall 1995
	Potomac Creek	Ms	USGS	Fall 1995
	Potomac Creek	Ms	USGS	Fall 1995
	Potomac Creek	Ms	USGS	Fall 1995
	Potomac Creek	Ms, Hv, Cd, Va	USGS	Fall 1995
	G4	Ms, Hv	USGS	Fall 1995
	G4	Ms, Hv, Cd, Nm	USGS	Fall 1995
	G4	Ms, Hv	USGS	Fall 1995
	G4	Hv, Ngu, Ms	USGS	Fall 1995
	I4	Hv, Ms, Nm	USGS	Fall 1995
	I4	Hv, Ngu, Nm, Cd, Ms	USGS	Fall 1995
	J4	Ms, Cd, Hv, Ngu, Hd	USGS	Fall 1995
	K2	Ms, Va	USGS	Fall 1995
	K2	Ms, Va	USGS	Fall 1995
065	A4	Ms, Va, Hv, Nm	USGS	Fall 1995
	A4	Va, Ms	USGS	Fall 1995
	B4	Va	USGS	Fall 1995
	B4	Va, Hv, Nm	USGS	Fall 1995
	B4	Va	USGS	Fall 1995

Quad	1995 Bed	Species*	Surveyor**	Survey Date
065	C4	Va, Cd, Ms	USGS	Fall 1995
067	B4	Ppf, Rm	USGS	08/02/95
	B4	Ms, Ec, Ppf, Rm	USGS	08/02/95
	B4	Ppf	USGS	08/02/95
	B4	Ms	USGS	08/02/95
	D4	Ppf, Ppc, Rm	USGS	08/02/95
	E4	Ppf, Ppc, Rm	USGS	08/02/95
	F4	Rm	USGS	08/02/95
	G2	Ppf	USGS	08/02/95
	H4	Ppf, Ms, Va, Rm, Ec	USGS	08/02/95
068	Neale Sound	Zp	Citizen	06/14/95
	Neale Sound	Ms	USGS	08/02/95
	B4	Rm	USGS	08/02/95
	C3	Rm	USGS	08/02/95
069	A3	Rm	USGS	08/02/95
	A3	Rm	USGS	08/02/95
070	Hickory Landing Creek	Zp	Citizen	05/23/95
	Mill Creek	Zp	Citizen	05/23/95
	Sam Abell Cove	Zp	Citizen	05/23/95
	Back Creek	Zp	Citizen	05/23/95
	Cuckold Creek	Zp	Citizen	05/23/95
	Forrest Landing Cove	Zp	Citizen	05/23/95
071	Pine Hill Run	Zp	Citizen	06/01/95
	Goose Creek	Zp	Citizen	06/05/95
	Goose Creek	Zp	Citizen	06/05/95
	Goose Creek	Zp	Citizen	06/05/95
	Goose Creek	Zp	Citizen	06/05/95
	Goose Creek	Zp	Citizen	06/05/95
	Goose Creek	Zp	Citizen	06/05/95
	Pearson Creek	Zp	Citizen	06/08/95
	Pearson Creek	Zp	Citizen	06/08/95
	Pearson Creek	Zp	Citizen	06/08/95
	Pearson Creek	Zp	Citizen	06/08/95
	Pearson Creek	Zp, U	Citizen	06/08/95
	Pearson Creek	Rm, Zp	Citizen	06/08/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
071	Pearson Creek	Zp	Citizen	06/08/95
	Pearson Creek	Zp	Citizen	06/08/95
	Harper Creek	Zp	Citizen	06/07/95
	Harper Creek	Zp	Citizen	06/07/95
	Harper Creek	Zp	Citizen	06/07/95
	Harper Creek	Zp	Citizen	06/07/95
	Harper Creek	Zp	Citizen	06/07/95
	Harper Creek	Zp	Citizen	06/07/95
	Patuxent River	Zp	Citizen	06/11/95
	Green Holly Pond	Ms, Rm	Citizen	07/03/95
073	A2	Zm	VIMS	06/19/95
	R2	Rm	VIMS	06/19/95
074	A2	Rm	VIMS	06/19/95
	C4	Rm	VIMS	06/19/95
	E3	Rm	VIMS	06/19/95
	F2	Rm	VIMS	06/19/95
076	Popes Creek	Zp	Citizen	05/06/95
	Duck Hall Point	U	Citizen	05/06/95
	Popes Creek	Zp	Citizen	05/06/95
	Burnt House Point	Zp	Citizen	05/06/95
	Popes Creek	Zp	Citizen	05/06/95
	Blake Point	Zp	Citizen	05/06/95
	Blake Point	Zp	Citizen	05/06/95
	Point of Point	Zp	Citizen	05/06/95
	Point of Point	Zp	Citizen	05/06/95
	Reel Point	Zp	Citizen	05/06/95
077	A3	Rm	USGS	08/02/95
	B2	Rm	USGS	08/02/95
	St. Catherine Sound	Rm	USGS	08/02/95
078	A3	Rm	USGS	08/02/95
	A3	Rm	USGS	08/02/95
080	Chancellors Point	Rm	Citizen	09/03/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
083	B1	Rm	VIMS	06/19/95
	F2	Rm	VIMS	06/19/95
	N2	Rm	VIMS	06/19/95
084	E2	Rm	Citizen	10/29/95
091	C2	Rm	VIMS	06/20/95
	C2	Rm	VIMS	06/20/95
	N3	Rm	VIMS	06/19/95
	K1	Rm	VIMS	06/19/95
093	DA3	Rm	VIMS	06/19/95
099	H4	Rm	VIMS	06/20/95
	B4	Rm, Zm	VIMS	06/20/95
	B4	Zm, Rm	VIMS	06/20/95
	B4	Rm	VIMS	06/20/95
	C2	Zm, Rm	VIMS	06/20/95
100	B4	Zm	VIMS	06/20/95
	B4	Zm	VIMS	06/20/95
	B4	Zm	VIMS	06/20/95
	B4	Rm	VIMS	06/20/95
	B4	Zm	VIMS	06/20/95
	I2	Rm	VIMS	06/20/95
	N2	Rm	VIMS	06/20/95
	M4	Zm	VIMS	06/20/95
	M4	Rm	VIMS	06/20/95
	M4	Rm, Zm	VIMS	06/20/95
101	G2	Rm	VIMS	06/19/95
	N2	Rm	VIMS	06/19/95
	P4	Rm, Zm	VIMS	06/19/95
	P4	Zm	VIMS	06/19/95
102	D2	Rm	Citizen	07/06/95
	C2	Rm, Zm	Citizen	07/06/95
	B2	Rm	Citizen	07/06/95
	A2	Rm, Zm	Citizen	07/06/95
	Rock Gut	Rm	Citizen	07/06/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
102	Rock Gut	Rm	Citizen	07/06/95
106	H1	Rm	Citizen	08/05/95
	Bull Neck	Rm	Citizen	08/05/95
	Haynie Point	U	Citizen	08/23/95
	Sandy Point	Rm	Citizen	08/23/95
	G3	Rm, Zm	Citizen	08/23/95
	F1	Rm, Zm	Citizen	08/23/95
	F1	Rm, Zm	Citizen	05/23/95
	E2	Rm, Zm	Citizen	05/23/95
	D4	Rm, Zm	Citizen	05/23/95
	B2	Rm	Citizen	07/08/95
	S. of Russell Point	Rm	Citizen	07/08/95
107	A2	U	Citizen	04/01/95
	L4	Zm, Rm	VIMS	06/19/95
	M1	Zm	VIMS	06/19/95
	K2	Rm	VIMS	06/19/95
	D4	Zm	VIMS	06/19/95
	D4	Zm	VIMS	06/19/95
108	BA3	Zm	VIMS	06/20/95
	S4	Rm, Zm	VIMS	06/20/95
	H2	Zm	VIMS	06/20/95
	H2	Zm, Rm	VIMS	06/20/95
109	B2	Zm	VIMS	06/20/95
	C4	Zm, Rm	VIMS	06/20/95
	C4	Zm	VIMS	06/20/95
111	A3	Rm	Citizen	10/09/95
	E2	Rm	Citizen	10/09/95
	A3	Rm	VIMS	06/20/95
	F2	Rm	VIMS	06/20/95
	E2	Rm	VIMS	06/20/95
112	I2	Rm, Zm	Citizen	06/05/95
	F1	Rm	Citizen	06/05/95
	V2	Rm	Citizen	06/16/95
	Dividing Creek	Zm	Citizen	06/16/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
112	Prentice Creek	Rm	Citizen	06/16/95
	U2	Rm, Zm	Citizen	06/16/95
	S2	Rm, Zm	Citizen	06/16/95
	R2	Rm, Zm	Citizen	06/16/95
113	F4	Zm	VIMS	06/20/95
114	U2	U	Citizen	08/12/95
	V2	U	Citizen	08/12/95
	Y4	Zm, U	Citizen	08/12/95
	Z4	Zm, U	Citizen	08/12/95
	F4	Zm, Rm	VIMS	06/19/95
	H4	Zm, Rm	VIMS	06/19/95
	H4	Zm	VIMS	06/20/95
	IC	Zm, Rm	VIMS	06/20/95
	BA1	Zm	VIMS	06/20/95
	N3	Zm	VIMS	08/12/95
118	F1	Zm	VIMS	06/19/95
	E2	Zm	VIMS	06/19/95
	B2	Zm, Rm	VIMS	06/19/95
	C1	Zm, Rm	VIMS	06/19/95
	D3	Zm, Rm	VIMS	06/19/95
119	L2	Rm	VIMS	06/20/95
	S3	Zm	VIMS	06/19/95
121	Poropotank River	Ppc, Zp, Ec, Pcr, Cd, Nt	VIMS	05/07/95
123	Q2	Rm, Zm	VIMS	07/11/95
	W2	Zm	VIMS	05/11/95
124	S1	Rm	Citizen	07/06/95
	V2	Rm	Citizen	07/06/95
	R4	Rm, Zm	VIMS	06/20/95
	G3	Rm, Zm	VIMS	06/20/95
131	HA4	Zm	VIMS	06/20/95
	EA4	Zm	VIMS	05/22/95
	X4	Rm, Zm	VIMS	07/19/95

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Quad	1995 Bed	Species*	Surveyor**	Survey Date
132	Y4	Rm	Citizen	10/01/95
	A4	Zm	VIMS	09/14/95
	A4	Zm	VIMS	09/14/95
	A4	Zm	VIMS	09/14/95
	A4	Zm	VIMS	09/14/95
	A4	Rm	VIMS	09/14/95
133	K2	Zm	VIMS	06/19/95
	F4	Zm	VIMS	06/19/95
	A2	Zm, Rm	VIMS	06/19/95
134	C4	Zm, Rm	VIMS	06/19/95
	D4	Zm, Rm	VIMS	06/19/95
139	A1	Zm	VIMS	07/20/95
	D1	Zm	VIMS	07/20/95
	E1	Zm	VIMS	07/20/95
	F2	Zm	VIMS	07/20/95
	G2	Zm	VIMS	07/20/95
140	D1	Zm	VIMS	07/20/95
	D1	Zm	VIMS	07/20/95
	A3	Zm	VIMS	07/20/95
147	V1	Zm	VIMS	06/02/95
	R1	Zm	VIMS	06/02/95
	S3	Zm	VIMS	06/02/95
	U1	Zm	VIMS	06/02/95
151	B4	Zm	VIMS	06/02/95
152	G1	Zm	Citizen	09/28/95
159	S. of Mondays Creek	Cd, Ec, Nfl, Nm	Citizen	07/12/95
	Trailer Park	Cd, Va, Ec, Ngu, Hv	PRP	07/27/95
	Back Channel	Hv, Ngu, Va, Cd, Ec	PRP	07/27/95
	S. of Back Channel	Hv	PRP	07/27/95
	N. of Rt. 4 Bridge	Cd, Ec, Hv, Ngu	PRP	07/27/95
	S. of Rt. 4 Bridge	Hv, Cd	PRP	07/27/95
	Marlboro Hunt Club	Hv, Ngu, Ngr, Ec, Cd	PRP	07/27/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
159	Mill Creek	Hv, Nm, Ec	PRP	07/27/95
	F2	Ngr, Hv, Cd, Pcr, Ngu	PRP	07/27/95
	E2	Hv, Ec, N	PRP	07/27/95
	D2	U	PRP	07/27/95
	Western Branch	Cd, Nm, Ngr	PRP	07/27/95
	Charles Branch	Ec	PRP	07/27/95
	Western Branch	Hv, Cd, Ec, Nm, Ngr	PRP	07/27/95
	Western Branch	Ec, Cd	PRP	07/27/95
	Mt. Calvert	Hv, Ngr, Ngu	PRP	07/28/95
	Jackson Landing	Hv, Cd, Ngr	PRP	07/28/95
	B3	Ngr, Hv	PRP	08/22/95
	C4	Hv	PRP	07/28/95, 08/22/95
162	A4	Ms, Rm	USGS	08/02/95
	A4	Rm	USGS	08/02/95
166	B3	Rm	Citizen	09/02/95
	B3	Rm	Citizen	09/02/95
	D2	Rm	Citizen	07/11/95
	E1	Rm	Citizen	07/11/95
	E1	Rm	Citizen	07/11/95
	E1	Rm	Citizen	07/11/95
	F2	Rm	Citizen	07/11/95
	I1	Rm	Citizen	07/21/95
	I1	Rm	Citizen	07/21/95
	Trailer Park	Rm	Citizen	07/21/95
	N of H2	Rm	Citizen	07/21/95
	Trailer Park	Rm	Citizen	07/21/95
	F2	Rm	Citizen	07/21/95
	F2	Rm	Citizen	07/21/95
	I1	Rm	Ocean Pines	07/21/95
	H2	Rm	Ocean Pines	07/21/95
	G3	Rm	Ocean Pines	07/21/95
	F2	Rm	Ocean Pines	07/21/95
	F2	Rm	Ocean Pines	07/11/95
	E1	Rm	Ocean Pines	07/11/95
	D2	Rm	Ocean Pines	07/11/95
	D2	Rm	Ocean Pines	07/11/95
	E1	Rm	Ocean Pines	07/11/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
167	W. of D3	Zm	Citizen	06/05/95
	N. of Grays Cove	Rm, Zm	Citizen	06/05/95
	N. of C3	Zm	Citizen	06/05/95
	A1	Zm	Citizen	06/08/95
	B2	Zm	Citizen	06/08/95
	C3	Zm	Citizen	06/08/95
168	Filtration Plant	Rm	Citizen	09/02/95
	Buffing	Rm, Zm	Citizen	06/05/95
	C2	Zm	Citizen	06/05/95
	D2	Zm	Citizen	06/05/95
	E2	Zm	Citizen	06/05/95
	F2	Zm	Citizen	06/05/95
	G3	Zm	Citizen	06/05/95
	Sinepuxent Bay	Rm, Zm	Citizen	06/05/95
	Sinepuxent Bay	Zm	Citizen	06/08/95
170	S2	Zm	Citizen	06/08/95
	S2	Zm	Citizen	06/08/95
	Q3	Zm	Citizen	06/08/95
	P3	Zm	Citizen	06/08/95
	I3	Zm	Citizen	06/29/95
	O4	Rm, Zm	Citizen	06/29/95
	O4	Zm	Citizen	06/29/95
	N1	Rm, Zm	Citizen	06/29/95
	C3	Zm	Citizen	06/29/95
	B2	Zm	Citizen	06/30/95
	I3	Zm	VIMS	07/10/95
	I3	Zm	VIMS	07/10/95
	I3	Zm	VIMS	07/10/95
172	A2	Zm	Citizen	07/03/95
	H2	Zm	Citizen	07/03/95
	Ragged Pt. Marshes	Zm	Citizen	07/03/95
	I3	Zm	Citizen	07/03/95
	L1	Zm	Citizen	07/03/95
	K4	Zm	Citizen	07/03/95
	J3	Zm	Citizen	07/03/95
	G1	Zm	Citizen	07/06/95
	F2	Zm	Citizen	07/06/95

Quad	1995 Bed	Species*	Surveyor**	Survey Date
172	D2	Zm	Citizen	07/06/95
	C2	Zm	Citizen	07/06/95
	C2	Zm	Citizen	07/06/95
	B2	Zm	Citizen	07/06/95
	B2	Zm	Citizen	07/06/95
	B2	Rm, Zm	Citizen	07/06/95
173	F2	Rm, Zm	Citizen	06/30/95
	D2	Rm, Zm	Citizen	06/30/95
	C2	Rm, Zm	Citizen	06/30/95
	G2	Zm	Citizen	07/06/95
	H1	Zm	Citizen	07/06/95
	H1	Rm, Zm	Citizen	07/06/95
	F2	Rm	Citizen	07/06/95
175	A3	Rm, Zm	Citizen	07/03/95
	C2	Zm	Citizen	07/03/95
	E2	Rm, Zm	Citizen	07/03/95
	E2	Zm	Citizen	07/03/95
	Greenbank Bay	Rm, Zm	Citizen	09/28/95
176	A4	Hv	USGS	Fall 1995