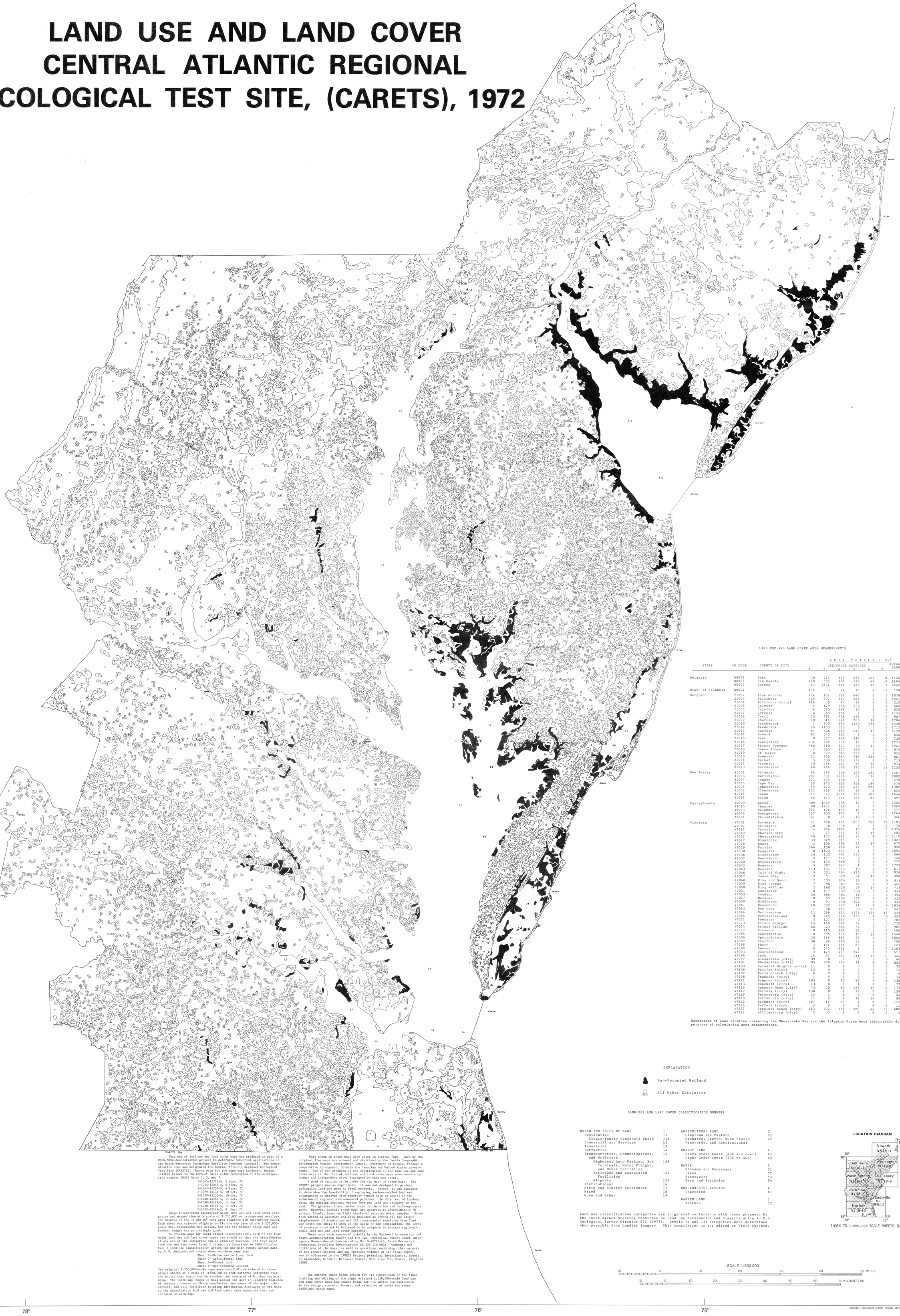
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS
FIELD STUDIES MAPS MF-798
(SHEET 5 OF 5)

LAND USE AND LAND COVER CENTRAL ATLANTIC REGIONAL ECOLOGICAL TEST SITE, (CARETS), 1972



LAND USE AND LAND COVER AREA MEASUREMENTS

STATE	ID CODE	COUNTY OR CITY	AREA TOTALS - Km² USE/COVER CATEGORY 1	2	4	5	6	7	TOTAL LAND	TOTAL LAND& WATER
Delaware	08001	Kent	30	974	377	552	164	0	1546	2098
	08002	New Castle	228	552	262	120	63	0	1105	1225
	08003	Sussex	63	1321	961	430	96	1	2442	2872
Dist. of Columbia	09001		138	0	21	10	0	0	159	169
Maryland	21002	Anne Arundel	294	187	591	448	3	1	1076	1524
	21003	Baltimore	416	607	524	229	0	0	1547	1776
	21004	Baltimore (city)	196	0	14	29	0	0	210	239
	21005	Calvert	4	179	380	330	5	1	569	899
	21006	Caroline	6	525	289	15	3	0	823	838
	21007	Carroll	6	963	186	7	0	0	1135	1162
	21008	Cecil	20	481	406	168	0	0	907	1075
	21009	Charles	10	314	871	260	11	0	1206	1466
	21010	Dorchester	7	529	652	1140	251	0	1439	2579
	21012	Frederick	26	1183	503	5	0	0	1712	1717
	21013	Harford	67	626	425	245	10	0	1128	1373
	21014	Howard	87	343	222	3	0	0	652	655
	21015	Kent	0	527	199	314	0	0	726	1040
	21016	Montgomery	234	702	339	15	0	0	1275	1290
	21017	Prince Georges	366	310	577	28	12	0	1265	1293
	21018	Queen Annes	2	693	275	360	2	0	972	1332
	21019	St Marys	8	329	613	889	1	0	951	1840
	21020	Somerset	12	269	364	715	216	0	861	1576
	21021	Talbot	5	500	207	538	6	0	713	1251
	21022	Wicomico	30	458	447	56	39	0	974	1030
	21023	Worchester	48	444	688	295	54	18	1232	1547
New Jersey	31001	Atlantic	96	265	920	146	186	0	1467	1613
	31003	Burlington	207	631	1206	39	38	0	2082	2121
	31004	Camden	222	226	130	7	0	0	578	585
	31005	Cape May	59	146	281	511	190	0	676	1187
	31006	Cumberland	52	470	542	475	238	0	1302	1777
	31008	Gloucester	135	459	253	22	6	0	853	875
	31015	Ocean	362	93	1088	355	103	0	1646	2001
	31017	Salem	18	540	246	127	93	0	897	1024
Pennsylvania	39009	Bucks	309	1028	248	17	0	0	1585	1602
	39015	Chester	80	1264	619	2	0	0	1963	1965
	39023	Delaware	212	126	139	16	0	0	477	493
	39046	Montgomery	357	733	173	4	0	0	1263	1267
	39051	Philadelphia	321	0	25	19	0	0	346	365
Virginia	47001	Accomack	21	478	406	1805	261	21	1187	2992
	47007	Arlington	70	0	0	3	0	0	70	73
	47017	Caroline	4	224	1147	10	1	0	1376	1386
	47019	Charles City	1	77	391	52	15	0	484	536
	47021	Chesterfield	48	142	919	28	1	0	1110	1138
	47027	Diswiddie	33	329	965	5	0	0	1327	1332
	47028	Essex	2	150	506	65	17	0	675	740
	47029	Fairfax	366	158	466	47	0	0	990	1037
	47030	Fauquier	0	1123	571	1	0	0	1694	1695
	47036	Gloucester	20	132	407	633	7	0	566	1199
	47037	Goochland	5	171	572	0	0	0	748	748
	47040	Greensville	42	175	560	3	0	0	777	780
	47042	Hanover	5	397	827	1	0	0	1229	1230
	47043	Henrico	113	131	373	13	0	0	617	630
	47046	Isle of Wight	5	331	484	125	6	0	826	951
	47047	James City	2	51	329	81	16	0	398	479
	47048	King and Queen	2	135	676	26	4	0	817	843
	47049	King George	7	98	361	87	0	0	466	553
	47050	King William	2	168	528	26	19	0	717	743
	47051	Lancaster	0	117	232	230	0	0	349	579
	47053	Loudoun	26	966	402	18	0	0	1394	1412
	47057	Mathews	0	85	134	385	6	0	225	610
	47059	Middlesex	0	91	250	171	1	0	342	513
	47061	Nansemond	10	332	675	71	9	0	1026	1097
	47063	New Kent	1	58	463	33	20	0	542	575
	47064	Northampton	12	269	124	1336	126	18	549	1885
	47065	Northumberland	0	215	286	235	1	0	502	737
	47071	Powhatan	5	127	569	0	0	0	701	701
	47073	Prince George	16	160	540	37	4	0	720	757
	47074	Prince William	66	323	516	37	0	0	905	942
	47077	Richmond	0	113	369	65	8	0	490	555
	47085	Southampton	0	585	930	10	13	0	1548	1558
	47086	Spotsylvania	20	186	862	22	0	0	1068	1090
	47087	Seafford	30	99	570	66	1	0	700	766
	47088	Surry	4	161	556	80	4	0	725	805
	47089	Sussex	8	343	926	1	6	0	1283	1284
	47093	Westmoreland	3	173	433	247	2	0	611	858
	47096	York	28	57	224	111	15	0	324	435
	47097	Alexandria (city)	39	0	1	3	0	0	40	43
	47101	Cheapeake (city)	85	279	523	21	1	0	888	909
	47103	Colonial Heights (city)	11	0	9	0	0	0	20	20
	47106	Fairfax (city)	13	0	0	0	0	0	13	13
	47107	Falls Church (city)	6	0	0	0	0	0	6	6
	47108	Franklin (city)	1	9	4	0	0	0	14	14
	47111	Hampton (city)	103	0	32	62	0	0	136	198
	47113	Hopewell (city)	13	0	9	1	0	0	22	23
	47116	Newport News (city)	73	20	62	125	20	0	175	300
	47117	Norfolk (city)	138	0	1	92	0	0	139	231
	47119	Petersburg (city)	15	1	8	0	0	0	24	24
	47120	Portsmouth (city)	71	0	4	29	10	0	85	114
	47122	Richmond (city)	107	11	39	4	0	0	157	161
	47126	Suffolk (city)	3	5	3	0	0	0	11	11
	47127	Virginia Beach (city)	183	202	224	280	44	15	688	948
	47129	Williamsburg (city)	3	0	1	0	0	0	4	4

Boundaries of some counties bordering the Chesapeake Bay and the Atlantic Ocean were arbitrarily drawn for purposes of calculating area measurements.

EXPLANATION

Non-Forested Wetland

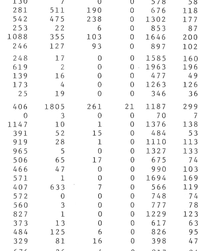
All Other Categories

LAND USE AND LAND COVER CLASSIFICATION NUMBERS

URBAN AND BUILT-UP LAND	1
Residential	11
Single-Family Household Units	111
Commercial and Services	12
Industrial	13
Extractive	14
Transportation, Communications, and Utilities	15
Highways, Auto Parking, Bus Terminals, Motor Freight, and Other Facilities	151
Railroads and Associated Facilities	152
Airports	153
Institutional	16
Strip and Cluster Settlement	17
Mixed	18
Open and Other	19
AGRICULTURAL LAND	2
Cropland and Pasture	21
Orchards, Groves, Bush Fruits, Vineyards, and Horticultural	22
FOREST LAND	4
Heavy Crown Cover (40% and over)	41
Light Crown Cover (10% to 40%)	42
WATER	5
Streams and Waterways	51
Lakes	52
Reservoirs	53
Bays and Estuaries	54
NON-FORESTED WETLAND	6
Vegetated	61
BARREN LAND	7
Beaches	72

Land use classification categories are in general conformance with those proposed by the Inter-Agency Steering Committee on Land Use Information and Classification in U.S. Geological Survey Circular 671 (1972). Levels II and III categories were determined when possible from Landsat imagery. This compilation is not edited or field checked.

LOCATION DIAGRAM



INDEX TO 1:250,000-SCALE SHEETS IN CARETS

SCALE 1:500 000

10 0 10 20 30 40 50 MILES

10 0 10 20 30 40 50 60 70 KILOMETERS

This set of land use and land cover maps was produced as part of a USGS/NASA demonstration project to determine potential applications of the Earth Resources Technology Satellite (renamed Landsat). The demonstration area was designated the Central Atlantic Regional Ecological Test Site (CARETS). Source data for the maps were Landsat-1 images (listed below) in the form of false-color composites of the multispectral scanner (MSS) bands 4, 5, and 7:

E-1045-15243-5, 6 Sept. 72
E-1045-15245-5, 6 Sept. 72
E-1045-15252-5, 6 Sept. 72
E-1079-15131-5, 10 Oct. 72
E-1079-15133-5, 10 Oct. 72
E-1080-15185-5, 11 Oct. 72
E-1080-15192-5, 11 Oct. 72
E-1080-15194-5, 11 Oct. 72
E-1133-15144-5, 3 Dec. 72

Image interpreters identified major land use and land cover categories and mapped them at a scale of 1:250,000 on transparent overlays. The mapping of the 74,000 km² test area required 110 interpreter hours. Each sheet was adjusted slightly to fit the map base of the 1:250,000-scale USGS topographic map series, but the fit between those maps and Landsat images was surprisingly good.

To provide maps for rapid visual interpretation, each of the four major land use and land cover types was shaded so that the distribution of any one of the categories can be visually scanned. The four major land use and land cover Level I categories described in USGS Circular 671, A land-use classification system for use with remote sensor data, by J. R. Anderson and others shown on these maps are:

Sheet 2--Urban and built-up land
Sheet 3--Agricultural land
Sheet 4--Forest land
Sheet 5--Non-forested wetland

The original 1:250,000-scale maps were compiled and reduced to these single sheets at a scale of 1:500,000 so that patterns extending over the entire test region can be examined and compared with other regional data. The index map (Sheet 1) will assist the user in locating features of interest, county and State boundaries, and names of the major urban centers, and will facilitate relating information displayed on the maps to the quantitative land use and land cover area summaries that are included on each map.

Data shown on these maps also exist in digital form. Each of the original line maps was scanned and digitized by the Canada Geographic Information System, Environment Canada, Government of Canada, through a cooperative arrangement between the Canadian and United States governments. One of the products of the digitization of the land use and land cover maps is the list of land use and land cover area measurements by county and independent city, displayed on this map sheet.

A word of caution is in order for the user of these maps. The CARETS project was an experiment. It was not designed to produce definitive land use maps as final products. Rather, it was designed to determine the feasibility of employing various-scaled land use information as derived from remotely sensed data to assist in the solution of regional environmental problems. In this test of Landsat data, the mapping accuracy varies from one land use category to the next. The greatest inaccuracies occur in the urban and built-up category. However, overall these maps are accurate to approximately 70 percent levels, based on field checks of selected point samples. Since this method of accuracy analysis included as errors (1) the slight misplacement of boundaries and (2) inaccuracies resulting from land use units too small to show at the scale of map compilation, the level of accuracy attained is believed to be adequate to portray regional-scale land use and land cover patterns.

These maps were sponsored jointly by the National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey under Interagency Memorandum of Understanding No. S-70243-AG, Earth Resources Technology Satellite Investigation SR-125 (IN-002). Comments and criticisms of the maps, as well as questions concerning other aspects of the CARETS project and the thirteen volumes of its final report, may be addressed to the CARETS Project principal investigator, Robert H. Alexander, U.S.G.S. National Center, Mail Stop 710, Reston, Virginia 22092.

The authors thank Eldon Jessen for his supervision of the final drafting and editing of the eight original 1:250,000-scale land use and land cover maps and Robert Dolan for his advice and assistance in the design, content, format, and selection of scale for these 1:500,000-scale maps.

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LAND USE AND LAND COVER IN CARETS: DELAWARE, DISTRICT OF COLUMBIA AND PORTIONS OF MARYLAND, NEW JERSEY, PENNSYLVANIA AND VIRGINIA, 1972, NON-FORESTED WETLAND

By

Robert H. Alexander, Katherine A. Fitzpatrick, Karen S. Letke, Harry F. Lins, Jr., and Herbert K. McGinty III