Descriptive Summary of the Changes in Coastal South Carolina, December 9, 1990, to January 5, 1995

Forested lands dominated the landscape of South Carolina with over 5 million acres (approximately 34 percent of the land) covered by evergreen, mixed, deciduous, and wetland forests. At more than 500,000 acres, forestry transitions constituted the greatest change detected by the C-CAP land cover analysis in South Carolina. These transitions represented a cyclic silviculture process, which involves the harvest and reforestation of evergreen tree stands. Evergreen farming is a monoculture farming practice common to the Southeast region of the United States. This process was clearly illustrated by the initial change of evergreen forest to bare land following the clearing of a forest, after which grasses colonized the area, transforming the land cover to grassland. Finally, after the reforestation of seedlings, this grassland started to develop into scrub/shrub, eventually reverting to mature evergreen forest. This was evidenced in the data set with over 16,000 acres of evergreen forest transformed to bare land, 72,000 acres of evergreen forest converted to grassland, and over 177,000 acres of scrub/shrub reverting to mixed forest. Other forest transitions included the reforestation of cleared lands and the transition of mixed forest habitats to monoculture.

Changes from evergreen, deciduous, and mixed forest covers to the components of human development were evidenced by transformations to grassland, bare land, and high and low intensity developed classes. Grassland and bare land reflect transitional features of development, since they will become lawns, parks, cemeteries, and golf courses. When forests are converted to low intensity development, such as residential neighborhoods, the impact to the affected forests may be less because, typically, 20 to 50 percent of the vegetative cover remains in residential neighborhoods through the incorporation of large yards, parks, and trees. High intensity development, such as industrial parks, parking lots, and highways, impact once-forested areas severely as the area is no longer predominated by vegetation; rather the landscape is dominated by buildings and paved surfaces.

A dominant feature on the South Carolina coast is the extensive salt marsh or estuarine emergent habitat. Over 3.5 million acres or 20 percent of the South Carolinian landscape was made up of saltwater and freshwater wetlands. Research has shown that salt marsh habitat is a rather stable environment, demonstrating little change during a twenty-year research period. Changes that do occur are generally related to human impacts or storms. Notable human changes are often state or federally permitted activities such as road or bridge construction. In the Charleston metropolitan area, change to the estuarine emergent environment included the Isle of Palms Connector crossing the marsh from Mount Pleasant to the Isle of Palms, and the James Island Connector linking Charleston and James Island. In South Carolina over 1,700 acres of wetlands were directly converted to developed areas from 1990 to 1995.

Storms alter the landscape through storm surges and high-speed winds, which push salt water landward, deposit sand and shell along the coast and in the salt marsh, wash out

areas of higher ground, defoliate forests, and destroy wetlands. Hurricane Hugo, in 1989, transformed the Carolina coast in several ways. First, the destruction of wetlands resulted in both the movement of wetlands and the gradual transition to other wetland classes as affected areas recovered. Second, the coastline of South Carolina changed in many places due to erosion and accretion processes attributed to storm surges. Finally, the defoliation of trees resulted in many full canopy forests being initially identified as scrub/shrub areas before recovery and regrowth lead to full canopy closure several years later.

Below are three tables. The first two tables contain a data summary for the time 1 and time 2 images. These images were used to create the change image and their tables include; land cover classes, the number of pixels present in each class, and their corresponding values in acres.

The third table is a complete change matrix for time 1 and time 2 images and includes a smaller, generalized table, which groups similar classes together. Table three compares each class from time 1 to time 2 and illustrates the change that took place between classes. The table presents the total acres for each class, the total percent that each class represents, the total acres that changed, and the percent of change they represent.

Tabular Summary: South Carolina, December 9, 1990

	CLASS	PIXELS	ACRES	PERCENT
0	Background	0	0	0.00%
1	Unclassified	0	0	0.00%
2	High Intensity Developed	533436	118633	0.66%
3	Low Intensity Developed	1154470	256747	1.43%
4	Cultivated Land	9922949	2206804	12.29%
5	Grassland	5412375	1203679	6.71%
6	Deciduous Forest	1445636	321501	1.79%
7	Evergreen Forest	10203069	2269101	12.64%
8	Mixed Forest	3976673	884388	4.93%
9	Scrub/Shrub	15207897	3382144	18.84%
10	Palustrine Forested Wetland	12877337	2863842	15.95%
11	Palustrine Scrub/Shrub Wetland	1528931	340025	1.89%
12	Palustrine Emergent Wetland	324991	72276	0.40%
13	Estuarine Forested Wetland	0	0	0.00%
14	Estuarine Scrub/Shrub Wetland	0	0	0.00%
15	Estuarine Emergent Wetland	1689960	375837	2.09%
16	Unconsolidated Shore	110222	24513	0.14%
17	Bare Land	336181	74765	0.42%
18	Water	15989108	3555881	19.81%
19	Palustrine Aquatic bed	0	0	0.00%
20	Estuarine Aquatic Bed	0	0	0.00%
21	Tundra	0	0	0.00%
22	Snow/Ice	0	0	0.00%
	TOTALS	80713235	17950134	100.00%

Tabular Summary: South Carolina, January 5, 1995

	CLASS	PIXELS	ACRES	PERCENT
0	Background	0	0	0.00%
1	Unclassified	0	0	0.00%
2	High Intensity Developed	557632	124014	0.69%
3	Low Intensity Developed	1200582	267002	1.49%
4	Cultivated Land	9741440	2166437	12.07%
5	Grassland	5838920	1298540	7.23%
6	Deciduous Forest	1382002	307349	1.71%
7	Evergreen Forest	9637288	2143274	11.94%
8	Mixed Forest	3570819	794128	4.42%
9	Scrub/Shrub	16121963	3585427	19.97%
10	Palustrine Forested Wetland	12331431	2742435	15.28%
11	Palustrine Scrub/Shrub Wetland	1741839	387374	2.16%
12	Palustrine Emergent Wetland	303756	67553	0.38%
13	Estuarine Forested Wetland	0	0	0.00%
14	Estuarine Scrub/Shrub Wetland	0	0	0.00%
15	Estuarine Emergent Wetland	1664318	370134	2.06%
16	Unconsolidated Shore	108010	24021	0.13%
17	Bare Land	502900	111842	0.62%
18	Water	16010335	3560601	19.84%
19	Palustrine Aquatic Beds	0	0	0.00%
20	Estuarine Aquatic Beds	0	0	0.00%
21	Tundra	0	0	0.00%
22	Snow/Ice	0	0	0.00%
	TOTALS	80713235	17950134	100.00%

Change Matrix and Tabular Summary: South Carolina, from December 9, 1990 to January 5, 1995

FROM / TO	High Intensity Developed	Low Intensity Developed	Cultivated Land	Grassland	Deciduous Forest	Evergreen Forest	Mixed Forest	Scrub/Shrub	Palustrine Forested Wetland	Palustrine Scrub/Shrub Wetland	Palustrine Emergent Wetland	Estuarine Forested Wetland	Estuarine Scrub/Shrub Wetland	Estuarine Emergent Wetland	Unconsolidated Shore	Bare Land	Water	Palustrine Aquatic Bed	Estuarine Aquatic Bed	Tundra	Snow/Ice	Total Acres	Changed	
2 High Intensity Developed	118633	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118,633	0	High Intensity Developed
3 Low Intensity Developed	746	255997	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	256,747	750	Low Intensity Developed
4 Cultivated Land	383	428	2145410	43265	0	0	0	14503	0	1574	14	0	0	2	0	530	696	0	0	0	0	2,206,806	61,396	Cultivated Land
5 Grassland	1008	2157	12171	1049230	0	0	1524	128079	0	5808	153	0	0	11	11	4527	522	0	0	0	0	1,203,677	154,447	Grassland
6 Deciduous Forest	33	109	176	2156	305884	0	1524	10635	92	415	16	0	0	0	0	379	80	0	0	0	0	321,501	15,617	Deciduous Forest
7 Evergreen Forest	887	2291	914	71667	0	1939630	3128	216293	5870	10239	942	0	0	29	11	16306	692	0	0	0	0	2,269,098	329,268	Evergreen Forest
8 Mixed Forest	265	912	437	18196	214	15598	780050	62393	1643	1664	111	0	0	6	1	2653	244	0	0	0	0	884,388	104,338	Mixed Forest
9 Scrub/Shrub	1272	3660	4942	73786	1039	176871	6173	3085930	4300	7601	587	0	0	54	18	14347	1559	0	0	0	0	3,382,141	296,211	Scrub/Shrub
10 Palustrine Forested Wetland	293	971	958	28307	207	4525	2884	44006	2726590	44212	572	0	0	55	7	8788	1469	0	0	0	0	2,863,844	137,254	Palustrine Forested Wetland
11 Palustrine Scrub/Shrub Wetland	105	190	943	5575	5	6448	370	11395	3649	307841	527	0	0	77	13	1652	1237	0	0	0	0	340,025	32,184	Palustrine Scrub/Shrub Wetland
12 Palustrine Emergent Wetland	20	26	79	2207	0	0	0	1537	294	2616	63619	0	0	151	12	1436	279	0	0	0	0	72,276	8,658	Palustrine Emergent Wetland
13 Estuarine Forested Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Estuarine Forested Wetland
14 Estuarine Scrub/Shrub Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Estuarine Scrub/Shrub Wetland
15 Estuarine Emergent Wetland	73	28	1	1382	0	0	0	711	0	2055	0	0	0	369556	282	999	750	0	0	0	0	375,837	6,281	Estuarine Emergent Wetland
16 Unconsolidated Shore	39	33	0	59	0	0	0	67	0	82	31	0	0	31	23249	290	631	0	0	0	0	24,613	1,263	Unconsolidated Shore
17 Bare Land	200	157	352	2026	0	0	0	9218	0	1372	667	0	0	31	284	58362	2094	0	0	0	0	74,765	16,402	Bare Land
18 Water	58	44	55	681	0	0	0	654	0	1896	315	0	0	129	131	1571	3550350	0	0	0	0	3,555,882	5,532	Water
19 Palustrine Aquatic Bed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Palustrine Aquatic Bed
20 Estuarine Aquatic Bed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Estuarine Aquatic Bed
21 Tundra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Tundra
22 Snow/Ice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Snow/Ice
Total Acres	124,014	267,002	2,166,440	1,298,538	307,349	2,143,272	794,128	3,585,422	2,742,438	387,375	67,554	0	0	370,134	24,021	111,842	3,560,603	0	0	0	0	14,399,782		Total Acres
Percent of Total	0.86%	1.85%	15.04%	9.02%	2.13%	14.88%	5.51%	24.90%	19.04%	2.69%	0.47%	0.00%	0.00%	2.57%	0.17%	0.78%	24.73%	0.00%	0.00%	0.00%	0.00%			Percent of Total
Total Acres that Changed (Y2-Y1)	5,381	10,255	-40,366	94,861	-14,152	-125,825	-90,259	203,282	-121,406	47,349	-4,723	0	0	-5,703	-492	37,077	4,721	0	0	0	0		1,169,601	Total Acres that Changed
Percent Change	4.54%	3.99%	-1.83%	7.88%	-4.40%	-5.55%	-10.21%	6.01%	-4.24%	13.93%	-6.53%	0	0	-1.52%	-2.01%	49.59%	0.13%	0	0	0	0		8.12%	Percent Change

FROM / TO	Developed	Cultivated	Grassland	Forested	Scrub/Shrub	Wetlands	Bare	Water	Total Acres	Changed	
Developed	375,376					4	1		375,381	5	Developed
Cultivated	810	2,145,410	43,265	0	16,077	1,590	531	696	2,208,380	62,970	Cultivated
Grassland	3,165	12,171	1,049,230	0	133,887	5,972	4,538	522	1,209,485	160,255	Grassland
Forested	5,761	2,486	120,327	5,788,039	389,857	21,027	28,146	2,485	6,358,126	570,088	Forested
Scrub/Shrub	5,227	5,885	79,361	198,854	3,412,767	9,194	16,030	2,795	3,730,114	317,347	Scrub/Shrub
Wetlands	1,705	1,981	37,471	14,440	57,649	3,521,813	13,190	3,734	3,651,982	130,169	Wetlands
Bare	430	353	2,086	0	10,739	2,213	82,185	2,725	100,731	18,546	Bare
Water	101	55	2,026	0	2,550	2,339	1,702	3,550,350	3,559,124	8,774	Water
Total Acres	392,575	2,168,340	1,333,766	6,001,333	4,023,527	3,564,151	146,322	3,563,308	14,399,782	1,268,153	Total Acres
Percent of Total (Y2/Total)	2.73%	15.06%	9.26%	41.68%	27.94%	24.75%	1.02%	24.75%		8.81%	Percent of Total
Total Change (Y2-Y1)	17,194	-40,040	124,282	-356,794	293,413	-87,831	45,591	4,184		1,268,153	Total Change (Y2-Y1)
Percent Change	4.58%	-1.81%	10.28%	-5.61%	7.87%	-2.41%	45.26%	0.12%		8.81%	Percent Change