358SERBSF10,620

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Site Name (Subject):	SOUTHERN WOOD PIEDMONT COMPANY
Site ID (Document ID):	NCD058517467
Document Name (DocType):	Expanded SI (ESI)
Report Segment:	5
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Date of Document:	7/16/1997
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U.S. ENVIRONMENTAL PROTECTION AGENCY,
REGION IV, WASTE MANAGEMENT DIVISION.

SOUTHERN WOOD PIEDMONT COMPANY - WILMINGTON SITE
NCD 058 517 467
EXPANDED SITE INSPECTION

REFERENCES
(22-43)
JULY 1997

MEMORANDUM

To: File
From: Stuart F. Parker, Jr., Hydrogeologist
Date: December 12, 1994
Re: Southern Wood Piedmont Co, Wilmington
NCD 058 517 467
Municipal Drinking Water Supplies
within the Wilmington Area.

SFP contacted personnel at the City of Wilmington Water Department and at the DEHNR Wilmington Regional Office to determine the locations and status of municipal drinking water sources within the study area, which (due to tides) includes 15-mile distances both upstream and downstream of the site on the Cape Fear and Northeast Cape Fear Rivers.

SFP telephoned J D Monroe of the NC DEHNR Water Supply Branch in Wilmington (910-486-1191) on 7/20/94. Monroe checked his listings of intakes for the region. According to his data, the primary intake is located on the Cape Fear River at approximately latitude 34°24'30", longitude 78°17'50". Two other intakes, one for Brunswick County and the other for Riegelwood Co., are also located there. This location is at least 30 miles upstream of Wilmington on the Cape Fear River.

A second municipal intake is located on Toomers Creek, a channel located in a tidal flat north of Eagle Island, 4 miles NW of downtown Wilmington. This intake was used as a standby. A third Wilmington intake is listed on Northeast Cape Fear River, at latitude 34°15'30", longitude 77°57'00", just downstream of Smith Creek.

SFP telephoned Chuck Davis, City of Wilmington Water Department (910-341-4683) on 7/25/94 and on 12/12/94 for additional information on the system. He confirmed that the main intake is more than 30 miles NW of Wilmington on the Cape Fear River. He was not familiar with any intake on the Northeast Cape Fear River (The indicated supply coordinates coincide with the location of the city's filtration plant). He reported that the Toomers Creek intake has not been used for several years (decades) because of high salinity due to tidal influence. He reported that no wells are used by the City, and that no other municipal supply systems operate in the County.

Maps of the Wilmington system's distribution lines are available at the City Engineering Department. According to Davis, the system's northern limit is presently at Division Drive, located directly north of Smith Creek off US Route 117. The service area includes the entire area within Wilmington's mapped city boundary.

SFP telephoned J Fred Hill, Water Supply Consultant at DEHNR's Washington, NC Regional Office (919-946-6481) on 7/19/94. Hill reported that the only active intakes in the Wilmington/Castle Hayne area are the ones located at Riegelwood. He reported that the intake at Smith Creek, like the Toomers Creek intake, is used only for emergencies because of high salinity.

SFP telephoned Ralph Harper, Environmental Engineer at the Wilmington Regional Office, Public Water Supply (910-395-3900) on 7/25/94 for information on local wells. Harper reported that Castle Hayne has no municipal system, but that community and private wells supply the population. Transient springs supply some water to taps at Greenwood Lake (a non-perennial, non-community supply).

SFP telephoned the Town of Leland on 8/9/94, where a purchase water supply is indicated on public water supply database (910-371-9949. Ms.Jean Steight, Administrator, reported that the water is purchased from Brunswick County/Cape Fear Water and Sewer Authority. There are no municipal wells. From Leland to the east edge of the county (at the Cape Fear River, approximately 50 % of residences are hooked up. The rest are on private wells.

TELEPHONE CONVERSATION SUMMARY

BLACK & VEATCH SPECIAL PROJECTS CORP.

Call made by: Cindy Treadway
Date: June 2, 1997
Time: 1415

Signature/Date: CTfordway 6-2-97

Person(s) contacted: Donna Jones
Title/Position: Secretary
Organization: City of Wilmington Water Department
Telephone number: (910) 341-7162
Address (city/state): Wilmington, North Carolina

General subject: Service area of the City of Wilmington.

Summary of conversation: Ms. Jones said that the City of Wilmington Water Department serves the area east of the Cape Fear River and south of Smith Creek. The area just north of Smith Creek is primarily served by private wells with the exception of the State Prison located on 23rd Street which is supplied drinking water by the City of Wilmington. I explained to Ms. Jones that I was looking at a topographic map of the area and she verified the water departments service area (notated on Ref. 1 of this ESI Report). Ms. Jones said that the water department operates a surface water intake on the Cape Fear River approximately 23 miles upstream of the City of Wilmington.

BLACK & VEATCH SPECIAL PROJECTS CORP.

Telephone Contact Summary

Call made by: Paul F. Moisan Signature/Date: Paul F. Moisan 5/20/97
Date: May 20, 1997
Facility: Southern Wood Piedmont
EPA ID No.: NCD058517467
Time: 1050

Person(s) contacted: Ms. Jean Speight
Title/Position: Director
Organizaton: Leland Sanitary District
Telephone No.: (910) 371-9949
Address (City/State): Leland, North Carolina

GENERAL SUBJECT: Service area information for the Leland Sanitary District.

CONVERSATION SUMMARY: Ms. Speight said that the Leland Sanitary District purchases all of their water from the Brunswick County Water Authority which has an intake upstream on the Cape Fear River, above Lock 1. Ms. Speight also said that the Leland service area covers all of Navassa, Woodburn, Clairmont, and south to beyond Jackeys Creek.

MEMORANDUM

To: File
From: Stuart F. Parker, Jr., Hydrogeologist
Date: December 1, 1994
Re: Southern Wood Piedmont Co., Wilmington
NCD 986 228 054
Radial House Count

SFP completed a house count within radial distance increments from the site using current US Geological Survey quadrangles (Ref 1). The data are summarized in Table 1.

No residents or workers are present at the site. The City of Wilmington's municipal water system serves most of the population within a 4-mile radius, particularly east of the Cape Fear River. The distribution system covers the entire area within city limits with a few extensions to the south, north, and east.

Of the population using private domestic wells within the study area, all of those in New Hanover Co. reside north of Smith Creek. All those in Brunswick Co. are located west of Eagle Island and the Brunswick River, over 1.5 miles from the site. Approximately half of these Brunswick residences are served by the Leland public water system, which, like the Wilmington system, originates outside the study area.

The results of the house count indicate that approximately 539 houses within a 4-mile radius use private groundwater wells. Multiplying by 2.68 persons per household in (Wrightsboro) New Hanover County and by 2.69 persons per household in (Leland) Brunswick County (Ref. 32), the resulting private well population numbers 1449. An additional 680 individuals are estimated to obtain water from 3 community wells within the 4-mile radius (Ref. 30). The resulting population count for groundwater use within 4.0 mi. of the site is therefore 2129 persons.

(next page)

Radial Distance (mi.):	House Count (Domestic Wells)		Population (Domestic Wells)		Population (Community Wells)	Total Well Population
	N Han. Co.	Brun. Co.	N Han. Co.	Brun. Co.		
0.0-0.25	0	0	0	0	0	0
0.25-0.5	0	0	0	0	0	0
0.5-1.0	0	0	0	0	0	0
10.-2.0	0	27	0	73	80	153
2.0-3.0	10	60	27	161	0	188
3.0-4.0	189	253	507	681	600	1788
		Total Subpop.	534	915	680	2129

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

US EPA Region IV
Old ATC Refinery
Public Water Supply

BVWST Project 52014.100
BVWST File
April 15, 1993
10:15 a.m.

To: Diane Fortune
Company: City of Wilmington Utilities Dept
Phone No.: 919/341-7805

Recorded by: Scotti Thomas

I called the City of Wilmington Utilities Dept. to determine which portions of the City of Wilmington within four miles of the site were served by public water. According to Ms. Fortune, the area east of the Cape Fear River and south of Smith Creek is served by the Wilmington Utilities Dept. Areas north of Smith Creek are on private wells.

The intake for the Wilmington Utilities Dept. is located on the Cape Fear River approximately 23 miles upstream of Wilmington.

BLACK & VEATCH SPECIAL PROJECTS CORP.

Telephone Contact Summary

Call made by: Paul F. Moisan Signature/Date: Paul F. Moisan 5/20/97
Date: May 20, 1997
Facility: Southern Wood Piedmont
EPA ID No.: NCD058517467
Time: 0930

Person(s) contacted: Ms. Leslie Royals
Title/Position: Engineering Technician
Organizaton: New Hanover County Engineering
Telephone No.: (910) 341-7139
Address (City/State): Wilmington, North Carolina

GENERAL SUBJECT: Groundwater information for the Runnymeade Subdivision.

CONVERSATION SUMMARY: Ms. Royals said that the two wells which serve the Runnymeade Subdivision draw from the Castle Hayne Aquifer. There are 256 houses in this subdivision hooked up to this community water system.

Reference 28

1990 CPH-1-35

1990 Census of Population and Housing

Summary Population and Housing Characteristics

North Carolina

Issued August 1991

U.S. Department of Commerce
Robert A. Mosbacher, Secretary
Rockwell A. Schnabel, Deputy Secretary

Economics and Statistics Administration
Michael R. Darby, Under Secretary
for Economic Affairs and Administrator

BUREAU OF THE CENSUS
Barbara Everitt Bryant, Director

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
The State	6 404 167	2 517 026	1 812 053	1 424 206	309 876	704 973	596 959	226 384	182 329	2.54	3.03	224 470	83 400	141 070
COUNTY														
Alamance County	105 227	42 652	30 745	24 295	5 130	11 907	10 467	4 598	3 748	2.47	2.94	2 886	1 173	1 713
Alexander County	27 245	10 331	8 049	6 715	952	2 282	2 022	829	651	2.64	3.02	299	299	-
Alleghany County	9 381	3 894	2 829	2 421	303	1 065	990	539	433	2.41	2.88	209	193	16
Anson County	23 117	8 531	6 359	4 552	1 475	2 172	2 042	1 075	860	2.71	3.23	357	344	13
Ashe County	21 965	8 848	6 748	5 643	816	2 100	1 935	1 014	809	2.48	2.89	244	220	24
Avery County	13 918	5 520	4 162	3 500	480	1 358	1 229	549	420	2.52	2.95	949	320	629
Beaufort County	41 704	16 157	11 840	9 140	2 186	4 317	3 915	1 974	1 605	2.58	3.07	579	441	138
Bertie County	20 321	7 412	5 501	3 831	1 419	1 911	1 797	957	755	2.74	3.28	67	67	-
Bladen County	28 150	10 760	8 017	5 854	1 762	2 743	2 579	1 243	1 000	2.62	3.11	513	509	4
Brunswick County	50 497	20 069	15 291	12 636	2 031	4 778	4 227	1 640	1 194	2.52	2.91	488	307	181
Buncombe County	169 713	70 802	49 335	39 637	7 684	21 467	18 868	8 174	6 642	2.40	2.90	5 108	2 966	2 142
Burke County	73 281	29 184	21 711	17 462	3 148	7 473	6 589	2 706	2 228	2.51	2.93	2 463	2 410	53
Cabarrus County	97 255	37 515	28 367	23 279	3 972	9 148	8 038	3 599	2 971	2.59	3.02	1 680	1 223	457
Caldwell County	69 917	27 172	20 656	16 653	2 944	6 516	5 660	2 287	1 846	2.57	2.97	792	735	57
Camden County	5 875	2 180	1 692	1 385	225	488	437	234	169	2.69	3.11	29	-	29
Carteret County	51 554	21 238	15 276	12 681	2 021	5 962	5 081	1 901	1 431	2.43	2.88	1 002	750	252
Caswell County	20 053	7 468	5 781	4 454	1 024	1 687	1 593	727	573	2.69	3.13	640	624	16
Catawba County	116 387	45 700	33 773	27 418	4 841	11 927	10 270	3 844	3 115	2.55	2.99	2 025	1 134	891
Chatham County	38 315	15 293	11 227	9 115	1 605	4 066	3 445	1 412	1 141	2.51	2.95	444	377	67
Cherokee County	19 899	7 966	6 069	5 065	765	1 897	1 764	975	759	2.50	2.91	271	196	75
Chowan County	13 233	5 113	3 775	2 842	767	1 338	1 238	641	499	2.59	3.07	273	273	-
Clay County	7 150	2 928	2 177	1 894	203	751	699	418	314	2.44	2.90	5	4	1
Cleveland County	83 012	32 037	24 282	19 011	4 168	7 755	7 011	3 202	2 624	2.59	3.02	1 702	915	787
Columbus County	48 953	18 459	13 754	10 381	2 757	4 705	4 351	2 152	1 695	2.65	3.15	634	624	10
Craven County	78 014	29 542	22 481	18 189	3 511	7 061	6 121	2 436	1 930	2.64	3.07	3 599	811	2 788
Cumberland County	253 362	91 500	69 966	54 433	12 883	21 534	17 718	4 724	3 752	2.77	3.19	21 204	1 499	19 705
Currituck County	13 486	5 038	3 854	3 272	407	1 184	984	419	312	2.68	3.06	250	217	33
Dare County	22 542	9 349	6 425	5 498	682	2 924	2 264	714	522	2.41	2.88	204	140	64
Davidson County	125 358	48 944	37 176	30 410	5 120	11 768	10 262	4 189	3 319	2.56	2.96	1 319	1 277	42
Davie County	27 541	10 785	8 270	6 999	953	2 515	2 246	1 025	817	2.55	2.95	318	288	30
Duplin County	39 368	14 925	11 036	8 376	2 099	3 889	3 553	1 779	1 439	2.64	3.12	627	560	67
Durham County	173 310	72 297	45 985	33 614	10 321	26 312	20 860	5 553	4 471	2.40	2.99	8 525	2 175	6 350
Edgecombe County	55 856	20 319	15 085	10 000	4 293	5 234	4 703	2 124	1 717	2.75	3.25	702	657	45
Forsyth County	257 466	107 419	72 621	55 715	14 052	34 798	29 870	9 779	7 975	2.40	2.94	8 412	3 493	4 919
Franklin County	35 237	13 503	10 047	7 640	1 865	3 456	3 120	1 384	1 126	2.61	3.07	1 177	568	609
Gaston County	172 791	65 347	49 754	38 905	8 439	15 593	13 580	5 720	4 720	2.64	3.07	2 302	1 458	844
Gates County	9 202	3 352	2 593	2 040	404	759	705	394	288	2.75	3.19	103	102	1
Graham County	7 176	2 772	2 166	1 829	246	606	562	294	225	2.59	2.98	20	18	2
Granville County	35 191	13 134	9 883	7 501	1 857	3 251	2 889	1 236	978	2.68	3.13	3 154	3 079	75
Greene County	14 665	5 395	4 066	3 003	875	1 329	1 189	574	481	2.72	3.18	719	704	15
Guilford County	335 348	137 706	92 891	71 195	17 570	44 815	36 578	12 180	9 951	2.44	2.97	12 072	3 084	8 988
Halifax County	54 122	20 335	14 874	10 092	4 018	5 461	5 005	2 398	1 897	2.66	3.18	1 394	1 356	38
Harnett County	65 340	25 150	18 529	14 489	3 154	6 621	5 773	2 438	1 962	2.60	3.06	2 482	1 240	1 242
Haywood County	46 152	19 211	14 120	11 831	1 774	5 091	4 601	2 337	1 886	2.40	2.83	790	751	39
Henderson County	68 206	28 709	21 169	18 113	2 344	7 540	6 838	3 531	2 859	2.38	2.80	1 079	967	112
Hertford County	21 612	8 150	5 921	4 164	1 473	2 229	2 063	977	766	2.65	3.19	911	279	632
Hoke County	21 612	7 405	5 794	3 847	1 605	1 611	1 419	523	420	2.92	3.34	1 244	1 244	-
Hyde County	5 383	2 094	1 533	1 151	321	561	516	269	191	2.57	3.07	28	19	9
Iredell County	92 082	35 573	26 869	21 726	4 023	8 704	7 646	3 271	2 682	2.59	3.02	849	814	35
Jackson County	23 834	9 683	6 970	5 749	981	2 713	2 242	966	745	2.46	2.91	3 012	280	2 732
Johnston County	80 341	31 566	23 217	18 566	3 634	8 349	7 441	3 380	2 750	2.55	3.01	965	893	72
Jones County	9 412	3 492	2 639	2 034	482	853	774	406	311	2.70	3.17	2	2	-
Lee County	40 651	15 689	11 739	9 087	2 135	3 950	3 482	1 369	1 107	2.59	3.03	723	672	51
Lenoir County	55 652	21 938	15 611	11 131	3 798	6 327	5 706	2 580	2 073	2.54	3.06	1 622	1 559	63
Lincoln County	49 802	18 764	14 661	12 207	1 827	4 103	3 580	1 467	1 173	2.65	3.03	517	517	-
McDowell County	35 064	13 680	10 366	8 576	1 363	3 314	2 996	1 399	1 135	2.56	2.99	617	416	201
Macon County	22 992	9 834	7 235	6 236	773	2 599	2 388	1 307	1 021	2.34	2.76	507	233	274
Madison County	16 104	6 488	4 806	4 058	516	1 682	1 510	789	581	2.48	2.92	849	104	745
Martin County	24 813	9 317	6 900	5 087	1 518	2 417	2 213	1 100	906	2.66	3.17	265	257	8
Mecklenburg County	499 886	200 219	134 361	103 211	25 013	65 858	52 037	12 990	10 610	2.50	3.05	11 547	3 578	7 969
Mitchell County	14 288	5 779	4 420	3 777	479	1 359	1 265	669	539	2.47	2.88	145	130	15
Montgomery County	22 279	8 290	6 274	4 823	1 119	2 016	1 838	876	690	2.69	3.14	1 067	997	70
Moore County	58 010	23 827	17 483	14 312	2 473	6 344	5 662	2 744	2 201	2.43	2.87	1 003	970	33
Nash County	75 450	29 041	21 224	16 322	3 968	7 817	6 926	2 880	2 316	2.60	3.09	1 227	807	420
New Hanover County	116 999	48 139	32 400	24 723	6 383	15 739	12 434	4 372	3 512	2.43	2.95	3 285	1 321	1 964
Northampton County	20 055	7 591	5 644	3 958	1 436	1 947	1 816	968	704	2.64	3.13	743	742	1
Onslow County	115 274	40 658	32 971	28 037	3 343	7 687	6 271	1 752	1 384	2.84	3.16	34 564	954	33 610
Orange County	84 627	36 104	21 123	16 854	3 380	14 981	10 110	2 257	1 839	2.34	2.93	9 224	770	8 454
Pamlico County	11 247	4 523	3 382	2 717	547	1 141	1 055	528	410	2.49	2.93	125	112	13
Pasquotank County	29 884	11 384	8 326	6 356	1 681	3 058	2 725	1 342	1 065	2.63	3.13	1 414	383	1 031
Pender County	28 497	11 112	8 420	6 707	1 371	2 692	2 388	1 055	796	2.56	2.99	358	348	10
Perquimans County	10 303	3 988	3 038	2 444	468	950	862	443	342	2.58	3.02	144	144	-
Person County	29 830	11 423	8 570	6 607	1 547	2 853	2 608	1 209	994	2.61	3.07	350	304	46
Pitt County	102 400	40 491	26 434	19 369	5 857	14 057	10 412	3 104	2 511	2.53	3.10	5 524	946	4 578
Polk County	14 187	6 110	4 346	3 693	511	1 764	1 599	952	748	2.32	2.79	229	227	2
Randolph County	105 440	41 096	31 363	26 135	3 957	9 733	8 590	3 435	2 789	2.57	2.97	1 106	1 050	56
Richmond County	43 534	16 793	12 270	9 126	2 551	4 523	4 174	2 011	1 600	2.59	3.11	984	875	109
Robeson County	103 186	36 154	27 429	18 451	7 233	8 725	7 891	3 355	2 651	2.85	3.34	1 993	1 280	713
Rockingham County	85 242	33 446	24 671	19 351	4 193	8 775	7 959	3 649	2 982	2.55	3.02	822	781	41
Rowan County	107 079	42 512	31 055	25 100	4 618	11 457	10 236	4 748	3 815	2.52	2.99	3 526	2 408	1 118
Rutherford County	54 197	22 198	16 480	13 191	2 551	5 718	5 255	2 556	2 050	2.53	2.99	721	721	-
Sampson County	46 754	17 526	13 191	10 058	2 525	4 335	3 975	2 032	1 610	2.67	3.14	543	490	53
Scotland County	32 679	11 837	8 971	6 225	2 338	2 866	2 618	1 173	935	2.76	3.25	1 075	401	674
Stanly County	50 734	19 747	14 967	12 451	1 975	4 780	4 396	2 164	1 785	2.57	3.01	1 031	470	561
Stokes County	34 862	14 123	11 022	9 341	1 273	3 101	2 825	1 246	1 016	2.61	3.00	361	361	-
Surry County	60 950	24 252	18 252	15 253	2 341	6 000	5 474	2 732	2 256	2.51	2.94	754	650	104
Swain County	10 653	4 173	3 083	2 382	550	1 090	985	447	369	2.55	3.01	615	215	400
Transylvania County	24 283	9 924	7 496	6 442	797	2 428	2 224	1 131	912	2.45	2.86	1 237	178	1 059
Tyrrell County	3 852	1 471	1 078	810	213	393	359	208	148	2.62	3.13	4	4	-
Union County	82 633	29 307	23 530	19 607	3 063	5 777	5 018	2 148	1 755	2.82	3.18	1 578	455	1 123

[redacted]ble 6. Household, Family, and Group Quarters Characteristics: 1990—Con.

[redacted] definitions of terms and meanings of symbols, see text]

State County [redacted]ace and [In Selected [redacted]States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Householder living alone: Total	65 years and over: Total	65 years and over: Female	Persons per—: Household	Persons per—: Family	Persons in group quarters: Total	Institutionalized persons	Other persons in group quarters
[redacted]UNTY—Con.														
[redacted]ce County	38 080	14 166	10 502	7 408	2 584	3 664	3 238	1 440	1 137	2.69	3.16	812	517	295
[redacted]ke County	408 267	165 743	109 543	88 547	16 581	56 200	42 662	9 449	7 828	2.46	3.01	15 113	6 571	8 542
Warren County	16 918	6 305	4 762	3 357	1 127	1 543	1 422	742	559	2.68	3.15	347	332	15
Washington County	13 762	5 052	3 839	2 826	833	1 213	1 151	584	454	2.72	3.21	235	234	1
Watauga County	32 476	13 693	8 415	7 121	975	5 278	3 437	1 041	833	2.37	2.88	4 476	279	4 197
[redacted]ne County	97 572	36 889	27 577	21 107	5 320	9 312	8 263	3 258	2 642	2.65	3.11	7 094	2 488	4 606
[redacted]es County	58 787	23 021	17 586	14 634	2 274	5 435	4 855	2 182	1 723	2.55	2.96	606	586	20
[redacted]on County	64 414	25 093	18 031	12 986	4 180	7 062	6 277	2 679	2 184	2.57	3.08	1 647	876	771
[redacted]kin County	30 053	12 068	9 173	7 720	1 124	2 895	2 669	1 333	1 059	2.49	2.90	435	424	11
Yancey County	15 235	6 124	4 683	4 010	510	1 441	1 354	729	586	2.49	2.90	184	184	-
PLACE AND COUNTY SUBDIVISION														
[redacted]rdeen town, Moore County	2 679	1 154	773	587	150	381	336	188	162	2.32	2.87	21	-	21
[redacted]skie town, Hertford County	4 258	1 769	1 164	770	356	605	576	272	229	2.41	3.07	133	130	3
[redacted]mance village, Alamance County	258	112	80	67	11	32	30	17	13	2.30	2.76	-	-	-
Albemarle city, Stanly County	14 403	6 054	4 169	3 205	812	1 885	1 746	913	762	2.38	2.92	536	459	77
Alexander Mills town, Rutherford County	662	279	176	111	55	103	93	59	50	2.37	2.97	-	-	-
Alliance town, Pamlico County	583	232	182	150	28	50	49	29	23	2.51	2.91	-	-	-
Altamahaw-Ossipee CDP, Alamance County	1 076	424	307	233	57	117	113	56	44	2.54	3.06	-	-	-
[redacted]rews town, Cherokee County	2 520	1 065	738	566	139	327	302	191	153	2.37	2.88	31	31	-
[redacted]er town, Harnett County	2 230	901	637	449	154	264	236	97	86	2.48	2.98	5	-	5
[redacted]onville town, Anson County	614	203	165	106	47	38	36	20	16	3.02	3.45	-	-	-
Apex town, Wake County	4 898	1 752	1 378	1 132	196	374	318	115	106	2.80	3.19	70	67	3
Arapahoe town, Pamlico County	430	175	129	108	15	46	44	26	21	2.46	2.93	-	-	-
Archdale city	6 913	2 803	2 085	1 758	248	718	643	183	155	2.47	2.90	-	-	-
[redacted]uilford County	234	82	72	66	5	10	8	3	3	2.85	3.07	-	-	-
[redacted]andolph County	6 679	2 721	2 013	1 692	243	708	635	180	152	2.45	2.89	-	-	-
[redacted]gton town, Yadkin County	795	333	239	170	57	94	91	52	41	2.39	2.86	-	-	-
Asheboro city, Randolph County	15 642	6 977	4 455	3 357	930	2 522	2 256	979	820	2.25	2.84	680	636	44
Asheville city, Buncombe County	59 322	27 027	16 218	11 717	3 759	10 809	9 511	4 233	3 509	2.19	2.84	2 285	1 269	1 016
Askewville town, Bertie County	201	81	60	56	4	21	21	15	14	2.48	3.00	-	-	-
[redacted]nson town, Pender County	275	119	85	67	13	34	31	21	20	2.31	2.79	-	-	-
[redacted]ntic Beach town, Carteret County	1 887	935	516	434	63	419	335	56	37	2.02	2.62	51	-	51
[redacted]nder town, Bertie County	1 209	454	320	213	98	134	123	76	58	2.66	3.29	-	-	-
Aurora town, Beaufort County	654	260	181	119	53	79	73	51	40	2.52	3.11	-	-	-
Autryville town, Sampson County	166	73	55	40	9	18	16	8	7	2.27	2.58	-	-	-
Avery Creek CDP, Buncombe County	1 144	408	341	304	27	67	60	15	11	2.80	3.13	-	-	-
Ayden town, Pitt County	4 735	1 795	1 305	854	386	490	445	230	199	2.64	3.13	5	5	-
[redacted]n CDP, Stanly County	1 481	616	420	315	87	196	183	119	103	2.40	2.97	-	-	-
[redacted]y town, Nash County	553	245	151	118	26	94	89	55	42	2.26	2.97	-	-	-
[redacted]ersville town, Mitchell County	326	148	99	71	17	49	44	21	15	2.20	2.71	6	6	-
Bald Head Island village, Brunswick County	78	39	32	31	1	7	7	-	-	2.00	2.22	-	-	-
Balfour CDP, Henderson County	1 118	494	344	280	51	150	132	58	47	2.26	2.72	-	-	-
Banner Elk town, Avery County	339	163	89	67	18	74	64	24	19	2.08	2.80	594	-	594
[redacted]er Heights CDP, Henderson County	1 137	468	345	248	84	123	107	47	33	2.43	2.83	-	-	-
[redacted]er Ten Mile CDP, Robeson County	1 087	372	329	292	26	43	34	12	10	2.92	3.12	-	-	-
[redacted] town, Beaufort County	154	81	41	29	12	40	36	25	20	1.90	2.66	-	-	-
Battleboro town	447	176	127	87	30	49	46	23	19	2.54	3.06	-	-	-
Edgecombe County	280	100	73	39	26	27	25	9	6	2.80	3.34	-	-	-
Nash County	167	76	54	48	4	22	21	14	13	2.20	2.67	-	-	-
[redacted]oro town, Pamlico County	720	283	201	130	63	82	75	31	29	2.54	3.10	13	13	-
[redacted]hore CDP, New Hanover County	1 641	605	517	471	30	88	80	26	22	2.75	3.00	-	-	-
[redacted]grass town, Martin County	77	35	24	19	4	11	11	6	6	2.20	2.75	-	-	-
Beaufort town, Carteret County	3 795	1 721	1 075	741	292	646	581	255	197	2.21	2.83	13	13	-
Beech Mountain town	239	109	78	75	1	31	25	6	4	2.19	2.55	-	-	-
[redacted]very County	7	3	2	2	-	1	1	-	-	2.33	3.00	-	-	-
[redacted]atauga County	232	106	76	73	1	30	24	6	4	2.19	2.54	-	-	-
[redacted]aven town, Beaufort County	2 241	840	588	359	192	252	233	138	110	2.67	3.29	28	28	-
Belmont city, Gaston County	7 774	3 049	2 149	1 603	407	900	811	354	296	2.55	3.09	660	-	660
Belville town, Brunswick County	66	28	12	7	5	16	11	4	2	2.36	3.75	-	-	-
Belwood town, Cleveland County	631	259	193	164	19	66	59	29	21	2.44	2.87	-	-	-
Benson town, Johnston County	2 728	1 137	718	456	207	419	388	202	176	2.40	3.08	82	67	15
[redacted] Creek CDP, Buncombe County	1 487	532	452	397	45	80	71	27	18	2.80	3.06	-	-	-
[redacted]emer City city, Gaston County	4 698	1 762	1 337	975	288	425	386	176	144	2.67	3.10	-	-	-
[redacted]l town, Pitt County	1 842	709	505	329	159	204	188	101	86	2.60	3.15	-	-	-
Bethlehem CDP, Alexander County	3 186	1 186	966	848	85	220	191	47	35	2.69	2.99	-	-	-
Beulaville town, Duplin County	921	411	274	194	67	137	122	63	52	2.24	2.77	12	12	-
Biltmore Forest town, Buncombe County	1 327	540	420	387	26	120	116	72	58	2.46	2.84	-	-	-
Biscoe town, Montgomery County	1 478	513	389	281	88	124	103	52	38	2.88	3.34	6	6	-
[redacted] Creek town, Wilson County	615	243	192	167	24	51	46	27	24	2.53	2.89	-	-	-
[redacted] Mountain town, Buncombe County	5 032	2 256	1 462	1 168	241	794	722	441	366	2.23	2.81	386	331	55
[redacted]nboro town, Bladen County	1 768	758	521	358	143	237	228	120	101	2.33	2.91	53	53	-
Blowing Rock town	1 179	570	333	286	34	237	213	85	68	2.07	2.73	78	76	2
Caldwell County	44	21	14	12	2	7	6	3	2	2.10	2.57	-	-	-
Watauga County	1 135	549	319	274	32	230	207	82	66	2.07	2.74	78	76	2
[redacted] City CDP, Lincoln County	1 373	549	414	341	60	155	143	56	42	2.41	2.89	-	-	-
[redacted]g Spring Lakes city, Brunswick County	1 650	666	523	447	53	143	122	54	38	2.48	2.79	-	-	-
[redacted]g Springs town, Cleveland County	1 675	668	493	380	89	175	148	59	55	2.51	2.94	770	44	726
Bolivia town, Brunswick County	228	87	64	50	12	23	21	15	13	2.62	3.13	-	-	-
Bolton town, Columbus County	531	206	148	96	43	58	56	34	22	2.58	3.16	-	-	-
Bonnie Doone CDP, Cumberland County	3 888	1 590	1 009	637	315	581	431	41	24	2.45	2.98	5	-	5
[redacted] town, Watauga County	8 607	4 053	1 470	1 141	248	2 583	1 305	275	238	2.12	2.71	4 308	127	4 181
[redacted]ville town, Yadkin County	998	403	299	247	49	104	97	62	54	2.48	2.93	11	-	11
[redacted] town, Rutherford County	371	137	111	92	15	26	22	11	8	2.71	3.04	-	-	-
[redacted]rd city, Transylvania County	4 609	2 072	1 331	1 026	272	741	693	421	365	2.22	2.82	779	168	611
Bridgeton town, Craven County	453	193	130	103	16	63	57	20	17	2.35	2.88	-	-	-
Broadway town	973	362	286	247	32	76	71	37	28	2.69	3.08	-	-	-
[redacted]rnett County	-	-	-	-	-	-	-	-	-	-	-	-	-	-
[redacted] County	973	362	286	247	32	76	71	37	28	2.69	3.08	-	-	-
[redacted]en CDP, Wayne County	3 246	1 059	851	624	182	208	162	33	25	3.07	3.44	-	-	-
Brookford town, Catawba County	451	189	133	93	27	56	52	31	21	2.39	2.85	-	-	-
Brunswick town, Columbus County	302	106	81	62	15	25	24	8	7	2.85	3.37	-	-	-
Bryson City town, Swain County	1 063	491	303	233	57	184	171	100	84	2.16	2.73	82	82	-

NEW HANOVER

DIVISION OF HEALTH SERVICES - ENVIRONMENTAL HEALTH SECTION - WATER SUPPLY BRANCH

* * * PUBLIC WATER SUPPLY DATA SHEET * * *ONLY SURFACE SOURCE

DATE OF RUN 05/16/90

NC INVENTORY DOCUMENT (PWSI.410) AS OF MAY 90

PWSI-ID RE-CO-SEQ	W0410S DATA LINE CODE				
04-65-010	03	NAME OF PUBLIC WATER SYSTEM WILMINGTON, CITY OF	RESPONSIBLE PERSON ADDRESS PO BOX 1810		
	04	RESPONSIBLE PERSON CITY WILMINGTON	STATE NC	ZIP CODE 28403	PHONE- AREA CODE/NUMBER 919-343-3690
	17	RESPONSIBLE PERSON NAME A G SURRATT OR MANAGER NOW	LOCATION OF PUBLIC WATER SUPPLY 407 HILTON ST.		UPDATE CODE C
	01	OWNERS NAME CITY OF WILMINGTON	OWNERS STREET ADDRESS DIR BOX 1810		
	02	OWNERS CITY WILMINGTON	STATE NC	ZIP CODE 28402	OWNER TYPE C

05 CITY OR COMMUNITY SERVED: WILMINGTON

COUNTY CODE: 065

IND RES: 000

SERVICE AREA CHARACTERISTICS

RES	COT	REC	MOH	INS	SCH	MOT	RET	SST	CAG	PIC	LOG	MRR	SKI	BAT	VIS	HWY	AIR	OTHER
1																		

06 NO. CONSECUTIVE PURCHASING	INTERSTATE CARRIERS	PWS TYPE	POPULATION SERVED	NO. SERVICE CONNECTIONS	NUMBER METERS	CONSECUTIVE INDICATOR
00	N	C	000057301	0018500	0018500	0

07 AVERAGE PRODUCTION GAL/DAY	DESIGN GAL/DAY	EMERGENCY GAL/DAY	STORAGE CAPACITY/GALS.	MAXIMUM PRODUCTION GAL/DAY
0008750000	0015000000	0015000000	0020500000	0013400000

08 PWS BEGIN	LAST SURVEY DATE	BACTI AND TURBIDITY COMPLIANCE CYCLE	ACTIVITY INDICATOR	DEACTIVATION DATE	DEACTIVATION REASON	ACTIVITY DATE
06/77	05/06/88	01	A	00/00/00		050688

09 POST CODE	REG BY	STATE REG	STATE DIS	BACTI FLAG	MONTHLY MONITOR	NUMBER SAMPLES	SEASON BEGIN	SEASON END	DAILY CHECKS	SAMPLE FREQ	MCL CK SAMPLE	CHLORINE P P M	TURBIDITY FLAG	UNITS
NC	B	04		L	Y	065	00/00	00/00	1	000	2	00	L	1.4

16 - - - - - - - - - SOURCE - - - - - - - -

NO.	NAME	CODE	NUMBER WELLS	AVL	RIVER BASIN	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC	PWSI-ID OF SELLER	WATER TREATMENTS 6 7 8 9 0 1 2 3 4 5 6 7 8
01	CAPE FEAR RIVER	S	00	P	0002	034	24	15	078	17	08	- -	B S R D C Y G
02	TOOMERS CREEK	S		R	0002	034	15	43	077	59	02	- -	
03	N E CAPE FEAR	S		E	0002	034	15	29	077	56	52	- -	
04	L CAPE FEAR W&S	S	00	E								- -	

Reference 29

Stuart Parker

PHMGRID STATE N.C. PUBLIC WATER SUPPLY SYSTEM 07/28/94
ACTIVE SYSTEMS
GRID LATITUDE: 340900 / 341630, LONGITUDE: 0775230 / 0780130

PWS ID	SYSTEM NAME	TYPE	POPULATION	RES.PERSON WORK PHONE	SOURCE NAME	SOURCE TYPE	SOURCE AVAIL.	LATITUDE	LONGITUDE
410070	LELAND SANITARY DISTRICT	C	3483	9103719949	BRUNSWICK CO	P	P	341350	780015
410131	~~SANDLIN RESTAURANT & HOTEL~~	~~N~~	85	9103716318	WELL	G	P	341345	775950
410138	~~CREEKSIDE TOWNHOMES~~	C	55	9107541609	WELL #1	G	P	341200	775900
410147	HICKORY BOARDING HOME	C	25	9103712339	WELL N	G	P	341345	775523
410426	~~SANDPIPER - SEAFOOD HOUSE~~	~~N~~	300	9103719262	WELL	G	P	341445	780055
410436	~~LELAND SHOPPING CENTER~~	~~N~~	1000	9192917635	WELLS	G	P	341415	780045
410437	~~TOWN AND COUNTRY HOTEL~~	~~N~~	33	9103712289	WELL	G	P	341250	775945
410462	MCDONALDS 5668	N	62	9103713112	WELL	G	P	341400	780000
410464	SHIRLEY'S BURGER HOUSE	N	40	9103712890	WELL	G	P	341330	780000
410468	WILSON'S #9	N	500	9103712696	WELL	G	P	341345	780000
410481	FEEDING SITE FOR ELDERLY	N	35	9102534391	WELL	G	P	341430	780030
410490	MCGEES MINI MART	N	100	9103712495	WELL	G	P	341430	780030
410510	H D LEE OIL COMPANY	N	50	9103716631	WELL	G	P	341410	780045
410511	SECURITY SAVINGS AND LOAN	N	35	9103716446	WELL	G	P	341438	775940
410512	FAMILY DOLLAR STORE	N	35	9103712431	WELL	G	P	341425	775935
410513	LELAND PROFESSIONAL CENTER	N	100	9103716386	WELL	G	P	341430	775925
410534	SCOTCHMAN #415	N	300	9103915300	WELL	G	P	341425	775940
465010	~~WILMINGTON WATER SYSTEM~~	~~C~~	~~57262~~	~~9103433690~~	~~CAPE FEAR RIVER~~	~~S~~	~~P~~	~~341545~~	~~775920~~
465105	BROOKFIELD S/D	C	500	9107990433	WELL #1	G	P	341617	775245
	~~BROOKFIELD S/D~~	~~C~~	~~400~~	9107990433	WELL #2	G	P	341618	775231
465129	KINGS GRANT WATER CO	C	5000	9107627997	WELL #3	G	P	341610	775305
465137	PALMS MHP	C	75	9107620944	WELL #1	G	P	341630	775530
465153	TOWN & COUNTRY MHP #1	C	140	9103950697	WELL #1	G	P	341530	775300
465163	ADJ-TOWN & COUNTRY MHP #2	A	25	9103950697	WELL #2	G	P	341530	775257
465190	RUNNYMEADE S/D	C	600	9103417139	WELL #1	G	P	341414	775314
	RUNNYMEADE S/D	C	~~600~~	9103417137	WELL #2	G	P	341414	775314
465410	DR JEWELLS DENTISTRY OFFICE	N	25	9107912401	WELL	G	P	341241	775241
465411	STUCKEY AUTO PARTS	N	25	9107995550	WELL	G	P	341241	775240
465427	WINTER PARK PENTECOSTAL HOLINE	N	150	9103716646	WELL	G	P	341250	775250
465436	CENTER PIER REST	N	500	9104589411	WELL	G	P	341118	775330
465437	CONVENANT FOOD MART	N	25	9107994200	WELL	G	P	340909	775403
465443	THE DUG OUT	N	100	9103227029	WELL	G	P	341110	775530
465454	CAPE FEAR ACADEMY	P	300	9107910287	WELL	G	P	340925	775310
	CAPE FEAR ACADEMY	P	~~300~~	9107910287	WELL	G	P	340925	775310
465467	HERITAGE BAPTIST CHURCH	N	250	9103924475	WELL	G	P	341000	775300
465473	UNITED ADVENT CHRISTIAN CHURCH	N	300	9107916393	WELL	G	P	340908	775415
465476	SOUTHSIDE BAPTIST CHURCH	N	350	9107994751	WELL	G	P	341030	775312
465482	TRAVELERS STATION	N	25	9197792036	WELL	G	P	341245	775242
465484	FIRST ASSEMBLY OF GOD	N	130	9107913671	WELL	G	P	341247	775253
465497	ARBYS UNIT 336	N	150	9107919892	WELL	G	P	341250	775245
465518	HUGH MCRAE PARK	N	300	9103417198	WELLS	G	P	341109	775314
	HUGH MCRAE PARK	N	300	9103417198	WELLS	G	P	341109	775314
	HUGH MCRAE PARK	N	300	9103417198	WELLS	G	P	341109	775314
	HUGH MCRAE PARK	N	300	9103417198	WELLS	G	P	341109	775314
465521	USCG LONSTA	N	25	9107910501	WELL	G	P	341330	775500
465528	FAST FARE	N	25	9107916301	WELL	G	P	341210	775308
465541	HARDEE'S CASTLE HAYNE ROAD	N	400	9107910185	WELL	G	P	341620	775602
465543	MIKES DAIRY-D-D	N	45	9107621332	WELL	G	P	341615	775610
465544	NASHVILLE EAST	N	300	9106069653	WELL	G	P	341615	775610

NOT SOURCE LOCATION

Ref. 30

PHMGRID STATE N.C. PUBLIC WATER SUPPLY SYSTEM 07/28/94
ACTIVE SYSTEMS
GRID LATITUDE: 340900 / 341630, LONGITUDE: 0775230 / 0780130

PWS ID	SYSTEM NAME	TYPE	POPULATION	RES.PERSON WORK PHONE	SOURCE NAME	SOURCE TYPE	SOURCE AVAIL.	LATITUDE	LONGITUDE
465564	NC NATIONAL GUARD WATER SYSTEM	P	50	9102517403	WELL #1	G	P	341330	775350

DIVISION OF HEALTH SERVICES - ENVIRONMENTAL HEALTH SECTION - WATER SUPPLY BRANCH

* * * PUBLIC WATER SUPPLY DATA SHEET * * *ONLY SURFACE SOURCE

NC INVENTORY DOCUMENT (PWSI.410) AS OF MAY 90

DATE OF RUN 05/16/90

PWSI-ID WO410S
RE-CO-SEQ DATA LINE CODE

04-10-045

03 NAME OF PUBLIC WATER SYSTEM: BRUNSWICK CO WATER SYSTEM
RESPONSIBLE PERSON ADDRESS: PO BOX 249

04 RESPONSIBLE PERSON CITY: BOLIVIA
STATE: NC
ZIP CODE: 28422
PHONE- AREA CODE/NUMBER: 919-457-9183

17 RESPONSIBLE PERSON NAME: O KENNETH HEWITT OR MGR NOW
LOCATION OF PUBLIC WATER SUPPLY: HWY 211 W SOUTHPORT
UPDATE CODE: C

01 OWNERS NAME: BRUNSWICK COUNTY
OWNERS STREET ADDRESS: PO BOX 249

02 OWNERS CITY: BOLIVIA
STATE: NC
ZIP CODE: 28422
OWNER TYPE: N

05 CITY OR COMMUNITY SERVED: BRUNSWICK CO
COUNTY CODE: 010
IND RES: 000
RES: 1
SERVICE AREA CHARACTERISTICS: COT REC MOH INS SCH MOT RET SST CAG PIC LOG MRR SKI BAT VIS HWY AIR OTHER
OTHER: 1

06 NO. CONSECUTIVE PURCHASING: 00
INTERSTATE CARRIERS: N
PWS TYPE: C
POPULATION SERVED: 000001905
NO. SERVICE CONNECTIONS: 0000635
NUMBER METERS: 0000635
CONSECUTIVE INDICATOR: 0

07 AVERAGE PRODUCTION GAL/DAY: 0008300000
DESIGN GAL/DAY: 0031500000
EMERGENCY GAL/DAY: 0007000000
STORAGE CAPACITY/GALS.: 0013950000
MAXIMUM PRODUCTION GAL/DAY: 0006800000

08 PWS BEGIN: 06/77
LAST SURVEY DATE: 05/27/88
BACTI AND TURBIDITY COMPLIANCE CYCLE: 01
ACTIVITY INDICATOR: A
DEACTIVATION DATE: 00/00/00
DEACTIVATION REASON:
ACTIVITY DATE: 052788

09

POST CODE	REG BY	STATE REG	STATE DIS	BACTI FLAG	MONTHLY MONITOR	NUMBER SAMPLES	SEASON BEGIN	SEASON END	DAILY CHECKS	SAMPLE FREQ	MCL CK SAMPLE	CHLORINE P P M	TURBIDITY FLAG	TURBIDITY UNITS
NC	B	04		L	Y	002	00/00	00/00	1	000	2	00	L	0.0

16 - - - - - - - - - SOURCE - - - - - - - - -

NO.	NAME	CODE	NUMBER WELLS	AVL	RIVER BASIN	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC	PWSI-ID OF SELLER	WATER TREATMENTS 6 7 8 9 0 1 2 3 4 5 6 7 8
01	CAPE FEAR RIVER	S	00	P	0002	034	24	30	078	17	47	- -	
02	211 WELL #1	G	01	P	0002	033	58	23	078	05	17	- -	Y C O M A L C G
03	211 WELL #2	G	01	P	0002	033	58	42	078	04	54	- -	
04	211 WELL #3	G	01	P	0002	033	58	05	078	04	51	- -	
05	211 WELL #5	G	01	P	0002	033	57	25	078	04	52	- -	
06	211 WELL #6	G	01	P	0002	033	56	51	078	04	55	- -	
07	211 WELL #7	G	01	P	0002	033	56	50	078	05	25	- -	
08	211 WELL #8	G	01	P	0002	033	56	57	078	04	49	- -	
09	211 WELL #11	G	01	P	0002	033	56	44	078	04	26	- -	
10	211 WELL #12	G	01	P	0002	033	57	10	078	04	28	- -	
11	211 WELL #12-A	G	01	P	0002	033	57	22	078	04	34	- -	
12	211 WELL #15	G	01	P	0002	033	56	11	078	04	25	- -	
13	211 WELL #16	G	01	P	0002	033	58	59	078	04	52	- -	
14	211 WELL #17	G	01	P	0002	033	56	11	078	02	55	- -	
15	211 WELL #18	G	01	P	0002	033	58	42	078	03	51	- -	

MEMO

TO: Superfund Section Staff

FROM: Jeanette Stanley
Environmental Chemist
NC Superfund Section

DATE: January 10, 1994

SUBJECT: Update on Status of Well Head Protection Programs in N.C.

I spoke with Carl Bailey, Groundwater Planning Branch Section Chief at (919) 733-3221. I asked him about Well Head Protection Areas (WHPAs) in North Carolina. Mr. Bailey said that Wally Venrick, Public Water Supply Section Chief, would be the most knowledgeable person on this subject.

I called Mr. Venrick at (919) 715-3232. He said that North Carolina has extended an invitation to communities to establish WHPAs, but none have been established. The cost to the community of establishing a WHPA exceeds the savings realized from waivers for certain analytical requirements. He does not anticipate that any WHPAs will be established prior to 1996.

Mr. Venrick said that there are minimum allowable distances between wells and certain structures (e.g. 100 feet between septic tanks and wells), but distances are arbitrary and vary depending on the structure.

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

Reference 31

TELEPHONE MEMORANDUM

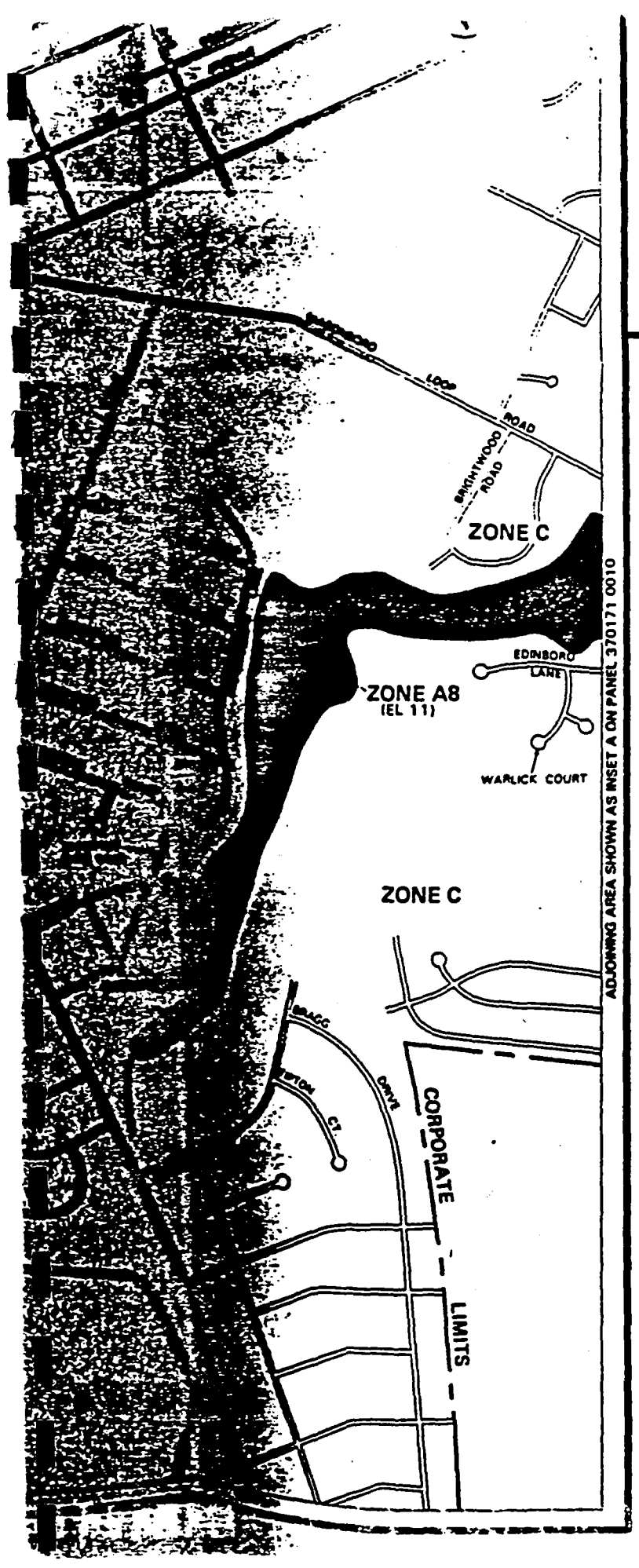
US EPA Region IV
Old ATC Refinery
Cape Fear River Flow Rate

BVWST Project 52014.100
BVWST File
April 29, 1993
10:05 a.m.

To: Rufus Allen
Company: U. S. Geological Summary
Phone No.: 919/571-4000

Recorded by: Scotti Thomas

I contacted the USGS to find out the flow rate of the Cape Fear River at Wilmington. Mr. Allen informed me that the nearest gaging station to Wilmington is located at river mile 67 at Lock 1. He said the Cape Fear River is tidally influenced at Wilmington.



To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

Reference 32

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
WILMINGTON,
NORTH CAROLINA
NEW HANOVER COUNTY

PANEL 5 OF 10

COMMUNITY-PANEL NUMBER
370171 0005 C

MAP REVISED:
NOVEMBER 4, 1987

Federal Emergency Management Agency

ION REFERENCE MARKS

DESCRIPTION OF LOCATION

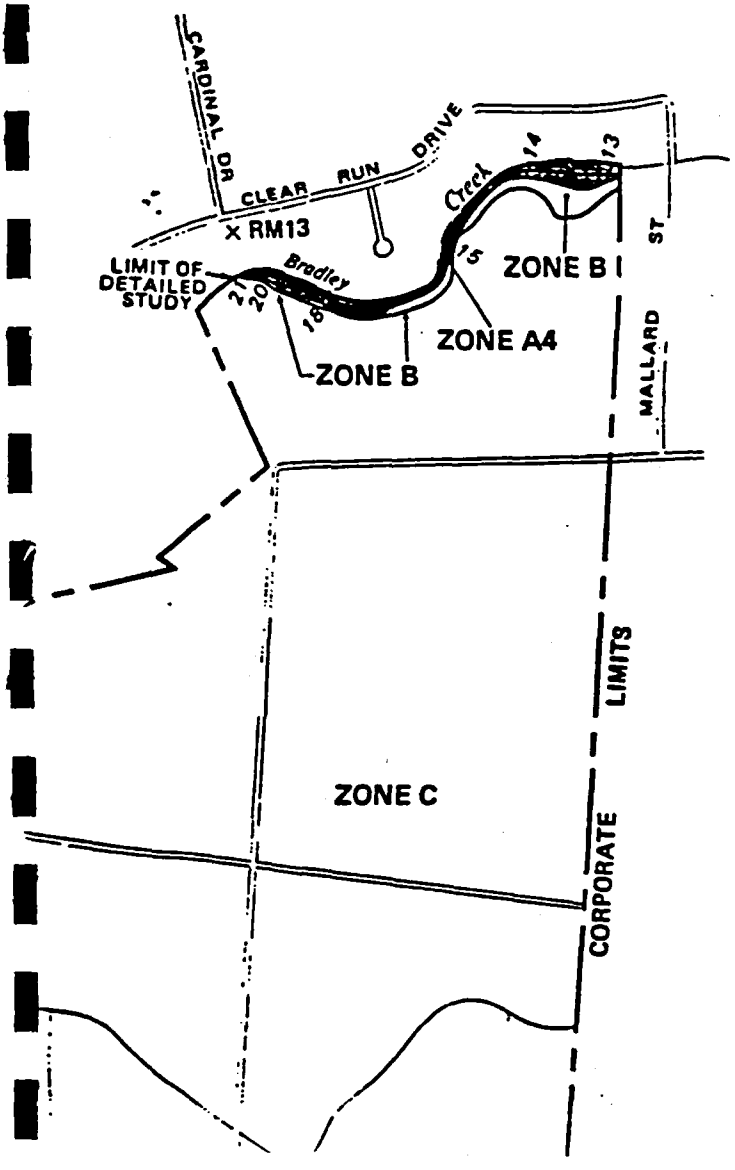
orps of Engineers ID cap in southwest end of headwall of Greenfield Lake Lake Branch Drive.

ydrant in northeast quadrant of Robin Hood Road and East Lake Shore ction.

ydrant in northeast quadrant of East Lake Shore Drive intersection with to Cypress Grove Apartments.

orps of Engineers ID cap on powerole at the north end of south traffic te Road 132 at the intersection with Shipyard Boulevard.

orps of Engineers ID cap on a powerpole with transformer on the south ection of Mockingbird Lane and Parkwood Drive.



KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	
Zone Designations*	ZONE B / ZONE B
100-Year Flood Boundary	
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7x
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Certain areas not in the Special Flood Hazard Areas may be protected by flood control structures.

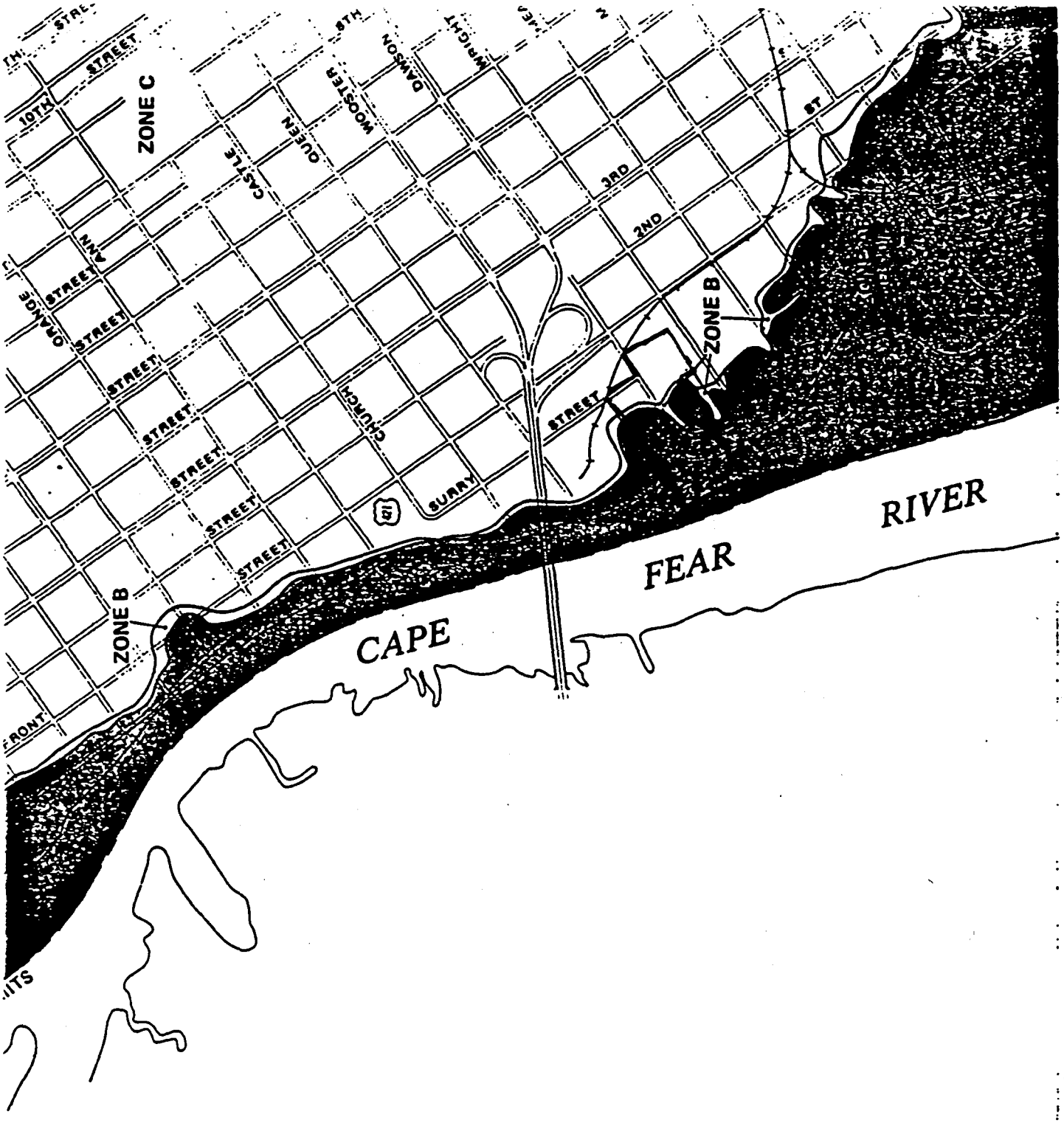
Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For adjoining panels, see separately printed Map Index.

INITIAL IDENTIFICATION:

MARCH 1, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:


ZONE C
ZONE B
ZONE B
CAPE
FEAR
RIVER
10TH
STREET
ORANGE
PINE
STREET
STREET
STREET
STREET
STREET
STREET
STREET
CASTLE
QUEEN
WOOSTER
DAWSON
WRIGHT
CHURCH
SURRY
STREET
3RD
2ND
ST
FRONT

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

U.S. EPA
Old ATC Refinery
Flow Rate for the
Cape Fear River

BVWS Project 52013.310
BVWS File SA
May 5, 1995
11:35 am

To: Dan Emerson
Company: U.S. Army Corps of Engineers
Phone No.: (910) 251-4761

Recorded by: Kem Reliford

Dan Emerson compiled flow rate data from the 1982 to 1992 10-year period for the Cape Fear River. The average annual flow rate represented by the 10-year data for the Cape Fear River is 5,247 cubic feet per second.

NATIONAL WETLANDS INVENTORY

NOTES TO USERS

INTRODUCTION

In 1974, the U.S. Fish and Wildlife Service directed its Office of Biological Services to conduct an inventory of the nation's wetlands. This National Wetlands Inventory (NWI) became operational in 1977.

Wetland delineations depicted on these maps were produced by stereoscopically interpreting high altitude aerial photography and then transferring this information with a zoom transfer scope to an overlay using U.S. Geological Survey 7.5' or 15' map series as base information.

Wetlands were identified on the photography by vegetation, visible hydrology, and geography, and subsequently classified in general accordance with Cowardin et al. (1979) Classification of Wetlands and Deep Water Habitats of the United States. Collateral information used in this mapping effort included U.S. Geological Survey topographic maps and Soil Conservation Service soil surveys. Where, for pragmatic reasons, strict adherence to this classification system was not possible, mapping conventions developed by NWI were used.

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

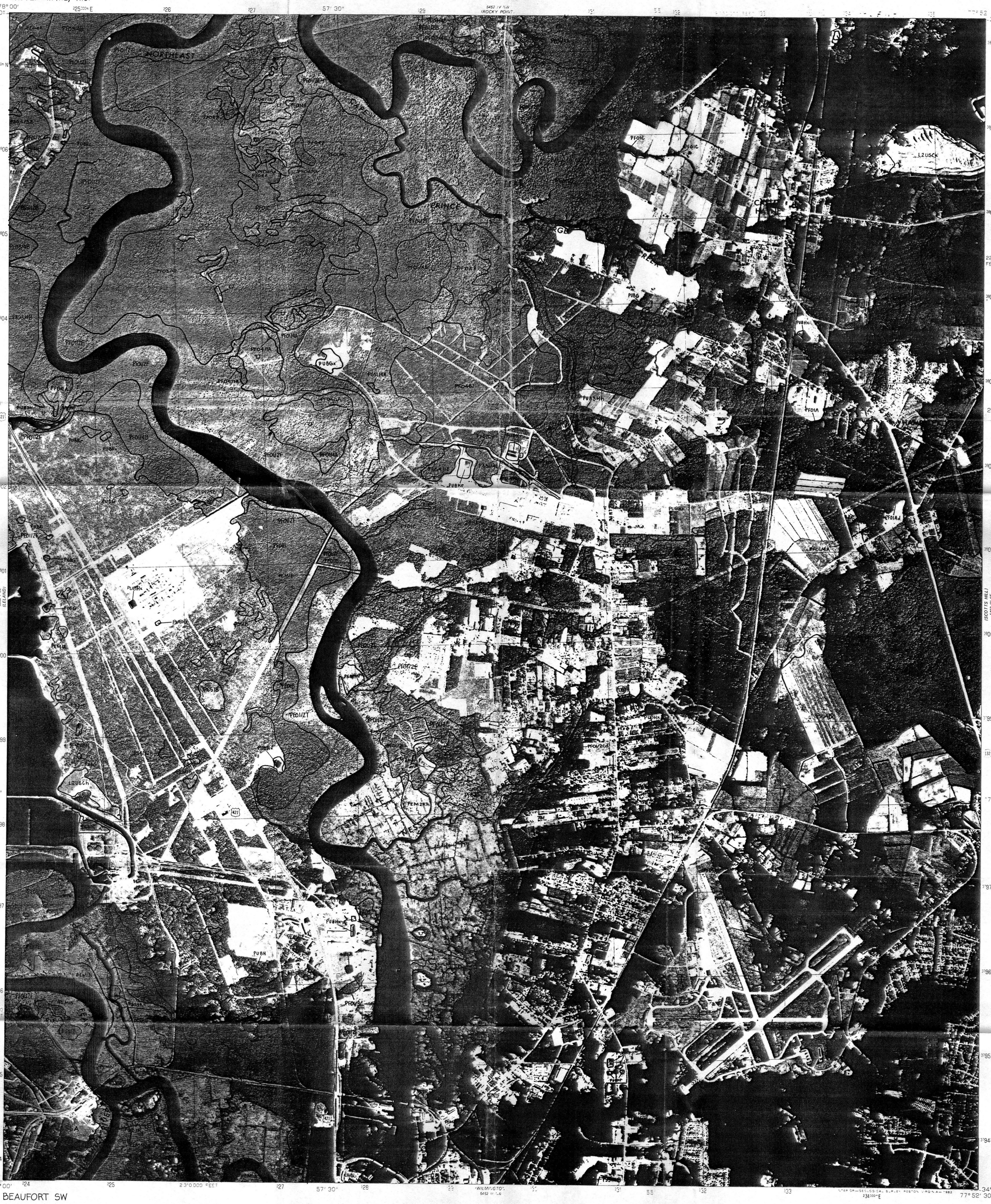
WILMINGTON, NC

STURGEON
CLAIRMONT
REDMOND CR
CREEK
WILMINGTON
ACREYS
CREEK
CREEK
PEMIN
PSS1/2F
PFO1/2F
PUBH
PSS3/1B
PSS1/2R
PFO3/4R
PSS1S
PSS1G
PSS1/2S
PFO1/2C
PSS3/1S
PSS1P
PFO1/4B
PFO1/2C
PSS3/1R
PSS1S
PFO1/2F
PUBH
PFO1/2F
PFO1/4B
PFO1/2F
PUBH
PFO1/2F
PUBH
PFO1/2F
PUBH

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

CASTLE HAYNE, N.C.


NORTHEAST
CAPE
FEAR
PRINCE
PUBGx
PUBHx
PFO1C
L2USCh
PFO1A
PFO1Ad
PFO1/2Cd
PEM2Kh
PUBH
PEM1B
PSS1B
PEM1F
PSS1C
L2USCh
PUBG
PUBKr
PUBHh
PUBHx
PUBH
PEM1F
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PEM1F

NORTH CAROLINA USER NOTES

MARINE SYSTEM

M1UBL - Ocean; boundaries extend from the outer edges of continental shelf shoreward to the landward limit of low tide along beaches and the seaward limit of the estuarine system in coastal inlets.

M1UB2L - Inlet shoals on the ocean side of an imaginary line connecting uplands of adjacent barrier islands, usually across the narrowest point of an inlet.

M2US2P - Unconsolidated shoreline (beach) as determined by land difference between low and high tide; M2US2N zone is included here.

Special cases

M2RS2P - Beach outcroppings of coquina limestone, found at Ft. Fisher, New Hanover County.

M2RS2Pr - Rip-rap jetties that extend into the ocean and that were constructed to stabilize navigation channels through inlets.

ESTUARINE SYSTEM

E1UBL - Open water of sounds and bays (i.e. Albemarle Sound) and unvegetated pools within saltmarshes; extends from leeward side of barrier islands to shore of mainland and to mouths of rivers and large tidal creeks, approximately to where ocean-derived salts are less than 0.5 ppt. For larger coastal rivers such as the Neuse or Pamlico, an arbitrary point, where the river narrows to less than a mile in width, was selected as the upstream limit of this wetland type.

E1UB2L - Inlet shoals on the embayment side of an imaginary line connecting uplands of adjacent barrier islands, usually across the narrowest point of an inlet.

E1UB3L - Open water of coastal rivers or streams extending from E1UBL to the palustrine system. Adjacent shoreline vegetation is usually saltmarsh.

E2US2M - Shoals occasionally exposed by wind tides along eroding headlands.

E2US2N - Sand flats usually derived from beach overwash and thus located leeward of barrier islands; exposed during low tide.

E2US2P - Sandy overwash islands, spits, and infrequent beaches that abut E1UBL.

E2US3M [E2US3N, E2US3P] - Large expanses of tidal mudflats within saltmarsh. Areas of unconfined dredged material are mapped as E2US3Ps.

E2EM1N - Saltmarsh community dominated by smooth cordgrass. The boundaries of this wetland type may include areas of open water, tidal mudflats and shellfish beds (E1UBL, E2US3N, and E2RF2N, respectively).

E2EM1P - Saltmarsh dominated by needle rush. In certain broad areas subject to inundation by freshwater, as around the eastern and southern shores of Dare and Hyde Counties, two distinct marshes are visible: the typical needle rush zone and a second marsh of sawgrass, giant cordgrass, cattails and switchgrass. For mapping purposes, the marshes are differentiated by water chemistry modifiers; needle rush is E2EM1P5 and mixed saltmarsh is E2EM1P6.

E2SS1P - Mixed shrub and saltmarsh flats that occur along the upper limits of E2EM1P on barrier islands, as a transitional zone around dredged material islands, along tidal creeks with substantial freshwater inflow, and on moist to somewhat dry saline soils. Due to the use of winter photograhpy, the deciduous shrubs of this wetland type were masked by groundcover forbs, thus giving the appearance of marshlands.

E2SS3P - Southern waxmyrtle and/or yaupon dominated shrublands in interdune swales, on washover flats of barrier islands, and infrequently, as transitional areas between estuarine and palustrine wetlands.

E2SS7P - Any combination of Southern waxmyrtle, yaupon, red bay, loblolly bay, sweet bay with pine or cedar (less than 20 ft. tall) on barrier islands but more commonly as the transitional wetland between estuarine and palustrine areas. Southern red cedar shrublands occur on calcareous mud near Mann's Harbor, Dare County; along creeks and the upper shores on New River estuary, Onslow County; near the Shallotte River, Brunswick County; and possibly elsewhere. Similar vegetation on dredged material is mapped as E2SS7Ps.

Special cases

E1UB3Lx - Atlantic Intracoastal Waterway and other dredged navigation channels where the channel alignment obviously did not coincide with existing streams.

E1AB3L - Shoalweed beds found adjacent to Emerald Isle near the western end of Bogue Sound. Other areas of seagrass beds exist in New River estuary of Onslow County and in Currituck Sound.

E2RF2P - Shellfish beds visible when the aerial photograph used in wetland delineation was taken.

E2FO4P - Loblolly pines with needle rush understory, usually located within the broader expanses of E2EM1P as near the mouth of Pungo River, in eastern Pamlico County and along the lower Pamlico and Neuse Rivers. Possible inconsistency in interpretation; may be mapped elsewhere as PFO4A, PFO4B.

RIVERINE SYSTEM

R1UB3V - Broad, sluggish, freshwater stretches of coastal plain rivers such as the Scuppernong, Perquimans, Northeast Cape Fear, etc. where the level of water in the channel is affected by wind or lunar tides.

R2UB3H - Stream channels in the coastal plain upstream from tidal effects; velocity is slow, turbidity high, and stream bottoms covered by sandy silt or mud.

R2UBH (R3UBH) - Piedmont and mountain streams where bottom conditions are unknown.

R2UB3H - Typical muddy bottom stream channel in the piedmont; may become R3UBH in the western piedmont or where shoals (R3RB1G) are prominent.

R3UB1H - Common stream type in mountains; occasionally becoming R3RB1H in areas of shoals; hornleaf riverweed is commonly associated with larger cobbles and boulders; aquatic mosses sometimes abundant.

R4SBC - Upper reaches of mountain streams.

Special cases

R1AB3V - Aquatic beds comprised of water lilies and spadderdock are common along large blackwater tributaries and coastal rivers such as the Northeast Cape Fear and Black River.

LACUSTRINE SYSTEM

L1UBH - Carolina bay lakes larger than 20 acres and other large natural lakes such as Great Lake in Croatan National Forest and Sawyer Lake in Alligator River National Wildlife Refuge.

L2AB3H - Thickly vegetated shallow bottom of Lake Mattamuskeet and Phelps Lake, perhaps others. Mapped as L2AB3/UB2H and L2AB2/UBH at Lake Mattamuskeet and L2OWH and L2AB6H at Phelps Lake.

L2US3Gh - Exposed drawdown zone in certain large impoundments in the piedmont and mountains as along the Yadkin River in High Rock Lake and the Little Tennessee River in Lake Hiwassee.

Special cases

L1UB1Hx - Flooded pits larger than 20 acres where limestone, phosphate, or other materials have been removed.

L1UB3Hh - Hydroelectric and water supply impoundments found mostly in the piedmont and mountains.

L2UB3Kx - Phosphate mine slime pond.

L2AB3K3h - Wildlife impoundments with submerged aquatic plants as in Pea Island National Wildlife Refuge.

L2US3Khs - Unvegetated, diked disposal areas for dredged material.

L2EM2K3h - Wildlife impoundments containing spikerush and other nonpersistant emergent plants as along the south shore of Lake Mattamuskeet and in eastern Pamlico County.

PALUSTRINE SYSTEM

PUBH - Natural ponds, smaller than 20 acres, occurring as interdune swales, as karst features (Sunny Point and Boiling Springs Lakes), as small Carolina bays, and as other flooded depressions of undetermined origin.

PAB3H - Shallow ponds colonized by water lilies, spadderdock, water shield, various species of pondweeds, or other aquatic plants.

PEM1A [PEM1C, PEM1F] - Freshwater marshes with varying degrees of wetness; occasionally applied to powerline rights-of-way and undrained field depressions. PEM1A is frequently applied to areas recently cleared for agriculture or silviculture. Dominant plants may include bullrushes, spikerushes, rushes, beakrushes, sedges, panic grasses, cattails and arrowheads.

PEM1B - Marshes or boggy areas in peatlands, Carolina bay depressions, or rarely, mountain bogs.

PSS1A [PSS1C] - Cutover timberlands, abandoned bottomlands fields, and infrequently, site-prepared silvicultural lands.

PSS4A [PSS4C] - Pine scrublands of loblolly and/or pond pine, abandoned lowland fields where pines have invaded, and occasional wet pine plantations.

PSS7A [PSS7B, PSS7C] - Mixed shrub assemblages of broadleaf evergreens and pines, sometimes mixed with cedars, or in the mountains, red spruce.

PSS1B - Non-alluvial scrub-shrub swamps dominated by titi or red maple as in Gull Rock Game Lands, Hyde County.

PSS3B - Gallberry or mixed bay shrub areas in peatlands; shrublands regenerating after forest fires. Also very rare montane bogs, covered mostly by species of rhododendron.

PSS4B - Scrub pinelands often over peat, and when mixed with or dominated by Atlantic white cedar, mapped as PSS4Bg.

PSS3C - Broad-leaved evergreen scrub-shrub swamps. Dominant shrubs include waxmyrtles, sweet bay, red bay and greenbriars; Japanese privet is common in some parts on the inner coastal plain.

PSS6C - [PSS6F] - Mixed baldcypress-hardwood shrub, willow, or buttonbush swamps.

PSS2F - Scrub pond cypress or baldcypress, often found as a pond fringe.

PFO1A - Bottomland forest in the mountains and piedmont where the streamflow is moderate and alluvium is fairly well-drained; dominant trees are river birch, sweetgum, red maple, yellow poplar, sycamore, American elm, sugarberry, bitternut hickory, swamp chestnut oak and box elder. Shingle oak is sometimes common in the mountains. Toward the eastern piedmont and on the driest bottomlands of the coastal plain, loblolly pine can be a frequent component. This forest type also occurs outside of bottomlands in certain parts of the coastal plain as in Pamlico, Bertie, and western Hyde Counties. On these sites, the soil has high base saturation and is usually silty or clayey.

PFO4A [PFO4C] - Loblolly pine forests, occasionally mixed with longleaf pine and/or pond pine on the coastal plain; shortleaf pine in the piedmont; white pine and hemlock in the mountains.

PFO5A [PFO5B] - Burned-over forest; possible to have salt kill in outer coastal plain.

PFO1B - Infrequently occurring non-alluvial hardwood swamps, dominated by sweet gum or red maple and black gum.

PFO4B - Pond pine and sometimes loblolly pine forests on peat soils or saturated mineral soils in the coastal plain; red spruce or pitch pine in the mountains. Atlantic white cedar forests are mapped PFO4Bg.

PFO6B - Non-alluvial swamps of baldcypress and/or black gum; occasionally red maple is present.

PFO7B - Mixed forest of evergreens, usually one or more species of pine and loblolly bay, red bay, or sweet bay; associated with peatlands; coastal plain only.

PFO1C - A forest type of limited occurrance in the western piedmont but common east of the Uwharries, especially in the Triassic Basin and on the western coastal plain. Species are much the same as in PFO1A with increased dominance of swamp chestnut oak, overcup oak, black gum, Southern red oak, Shumard oak, laurel oak, willow oak, river birch and water hickory.

PFO6C - A common inner coastal plain forest type with baldcypress invariably present; otherwise, similar to PFO1C.

PFO7C - Dune ridge swales; dominated by bays, live oak, pine or cedar. Found in many maritime forest areas.

PFO2F - Pond cypress or baldcypress swamps; originally reserved for baldcypress-tupelo gum swamps.

PFO6F - Predominantly baldcypress and black gum, or tupelo gum and Carolina ash in the wettest sites; frequent along coastal plain rivers and large creeks. Blackwater river swamps in SE NC may also have water elm.

PFO5G - Forest killed from excessive flooding as in the upper reaches of impoundments (human-made or beaver).

PFO6G - Forested ponds or fringes of ponds were some combination or single species of the following occur: pond cypress, baldcypress, water tupelo, black gum, willow and red maple.

Special cases

PRB1Gx - Quarry pool in an area with active mining.

PRB1Hx - Abandoned quarries that remain permanently flooded.

PUB1Gx or Hx - Gravel pit containing water, usually located in a floodplain.

PUB2Gx or Hx - Sand pit containing water, usually in a floodplain or in riverine sand ridges.

PUB3Gx - Large, shallow roadside borrow pits, often seen along newer highways such as interstate highways; sites are mostly former uplands.

PUBHh - Farm or golf course ponds that are irregular in outline, located near the headwaters of small drainages wher the flow of water has been obstructed by human-made dams. The lower case "h" modifier is applied to other wetlands that occur upstream from the ponds and that have hydrologies affected by impoundment.

PUBHx - Excavated irrigation ponds, usually rectangular in outline.

PUB3Kr - Regular-shaped wastewater lagoons, sometimes constructed in uplands adjacent to wetlands; with concrete, gravel, or cobble substrates, and flooded with wastewater. Lagoons associated with farming operations may also be mapped as farm ponds or irrigation ponds.

PEM1Khs - Diked dredged material disposal areas, often colonized by common reed or cattails.

PEM1N - Freshwater or very midly brackish water marshes formerly used for wild rice cultivation with little or no evidence of prior impoundment; Cape Fear region.

PEM1Sh - Partly impounded marshes formerly used for wild rice cultivation; generally restricted to lower Cape Fear region.

PEM2Kh - Small wildlife impoundments with nonpersistant grasses and sedges.

PSS1Gb - Mixed shrub and marsh (PAB3Gb, PEM1Gb) areas in beaver ponds.

In mapping eastern North Carolina, exceptions always arise and many different combinations of alphanumerics have been tried. The earlier maps contain mixed classes and mixed subclasses. Unfortunately, this practice has all but eliminated any reasonable chance at data processing, in that the number of permutations is staggering.

Although certain mixed categories more accurately depict the actual field conditions, for example, PFO4/SS3B for pocosin wetlands with a pond pine overstory and a gallberry and bay understory, we are refraining from execessive use of mixed groups. Current NWI convention guidelines allow only these combinations or their reciprocals: for SS 1/3 and 1/4, for FO, 1/2, 1/3, 1/4, 2/4, and 6/7. In North Carolina, an SS1/3 is almost impossible to find without pines (4), and the FO2/4 doesn't exist here. Therefore, the likely combinations are SS1/4, SS4/1, FO1/2, FO2/1 (must be verified by field truthing), FO1/3, FO3/1 (rare or nonexistent), FO1/4, FO4/1, FO6/7, and FO7/6.

Early maps also show frequent use of combinations such as EM/SS, FO/SS, etc. We have tried to eliminate all of these mixed classes.

Revised: May, 1988
NC Department of Natural Resources and Community Development
Division of Soil and Water Conservation
P.O. Box 27687
Raleigh, NC 27611

NWI MAPS ARE NOT FOR REGULATORY USE

THE NATIONAL WETLANDS INVENTORY (NWI) IS A PROJECT OF THE U.S. FISH AND WILDLIFE SERVICE. THE NWI MAPS DO NOT DEFINE WETLANDS FOR REGULATORY PURPOSES. WETLAND BOUNDARIES MAY NOT BE EXACT.

IF YOU ARE CONSIDERING LAND USE CHANGES AND YOU ARE NOT SURE WHETHER THE LAND CONTAINS REGULATED WETLANDS, YOU CAN OBTAIN A SITE-SPECIFIC WETLANDS DETERMINATION FROM A PRIVATE CONSULTING FIRM OR THE APPROPRIATE GOVERNMENT AGENCY, SUCH AS:

U.S. ARMY CORPS OF ENGINEERS

U.S. ENVIRONMENTAL PROTECTION AGENCY

NATURAL RESOURCES CONSERVATION SERVICE
(formerly SOIL CONSERVATION SERVICE)

BLACK & VEATCH SPECIAL PROJECTS CORP.

Owner: USEPA Region IV
Plant: Southern Wood Piedmont Unit: Wilmington, NC
Project No. 52014.755 File No.
Title: Wetlands Acreage Estimates

Computed By: Robert Mangum
Date: 6-11 19 92
Checked By
Date 19
Page 1 of 1

DO NOT WRITE IN THIS SPACE

Using a Timesaver Acreage Template and the following USGS 7.5 Minute Topographic Quadrangle Maps: Leland, NC (1984); Castle Hayne, NC (1970); Winnabow, NC (1990); and Wilmington, NC (1970, Photorevised 1979).

Wetlands on site: 10 acres

0 - 1/4 Mile Radius: 32.5 acres

1/4 - 1/2 Mile Radius: 130 acres

1/2 - 1 Mile Radius: 690 acres

1 - 2 Mile Radius: 3,400 acres

2 - 3 Mile Radius: 4,640 acres

3 - 4 Mile Radius: 3,840 acres

Total 12,742.50 acres estimated Wetland Acreage within 4-miles (radius) of the Southern Wood Piedmont site in Wilmington, New Hanover County, North Carolina.

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Parks & Recreation

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
Dr. Philip K. McKnelly, Director

Reference 36

DEHNR

May 28, 1997

Mr. Paul F. Moisan
Project Manager
Black and Veatch
400 Northridge Road, Suite 350
Atlanta, GA 30350

SUBJECT: Rare Species, High Quality Natural Communities, Critical Habitats or Significant Natural Areas in the Southern Wood Piedmont Project near Wilmington, New Hanover and Brunswick Counties, North Carolina

Dear Mr. Moisan:

The North Carolina Natural Heritage Program has records of the following rare species, high quality natural and priority areas in a four mile radius of the Southern Wood Piedmont Project Site and within the Cape Fear River basin up to 15 miles downstream of this facility. This is a rich and diverse area with many significant species that depend on an aquatic habitat either for food, nesting, or other survival needs. We strongly recommend that you use best management practices to avoid negative impact on the area surrounding the project site. Because the immediate area is aquatic (riverine and estuarine), introduction of toxic pollutants would be detrimental to species on multiple levels of the ecosystems for many miles both south and north of the site.

PRIORITY AREAS:

Lower Cape Fear River Aquatic Habitat -[Northwest, west, southwest of Wilmington] Brackish water, containing numerous rare animals, runs from north of Wilmington south to Smith Island for approximately 20-25 miles. Rare animals include the Federally Endangered Shortnose Sturgeon *(Acipenser brevirostrum)* and Manatee *(Trichechus manatus)* which occasionally occurs, especially in summer. Federally Threatened alligators *(Alligator mississippiensis)* are present mainly in tributary streams which feed into this basin. State significantly rare marine and estuarine fishes of the river are Freckled Blenny *(Hypsoblennius ionthas)*, Spinycheek Sleeper *(Eleotris pisonis)*, Opossum pipefish *(Microphis brachyurus)*, and Marked Goby *(Gobionellus stigmaticus)*.

Lower Cape Fear River Bird Nesting Islands (Gull-Tern-Skimmer Colony and Wading Birds Rookery) -This natural area includes several islands, most of which are dredge spoil islands, in the lower Cape Fear River west of Carolina and Kure Beaches,. These islands provide nesting for colonial water birds. NC Species of Concern, Brown pelicans *(Pelecanus occidentalis)* nest in large numbers, along with several species of terns. Other rare species include state Special Concern Snowy Egret *(Egretta thula)*, Little Blue Heron *(Egretta Caerulea)*, Tricolored Heron *(Egretta Tricolor)*, Glossy Ibis *(Plegadis falcinellus)*, and Black Skimmer *(Rynchops niger)* and state Threatened Gull-

billed Tern *(Sterna nilotica)*.

Brunswick River-Cape Fear River Marshes - [West and northwest of Wilmington] Extensive marshes in the area are the largest example in the state of regularly flooded Tidal Freshwater Marshes. The marshes are the only places known in North Carolina to have populations of the scarce Federal Species of Concern Rare Skipper butterfly *(Problema bulenta)*. They support state Candidate plants, Ribbed Bishopweed *(Ptilimnium costatum)* and Carolina Bishopweed *(Ptilimnium sp.1)* and the significantly rare plant, Spoonflower *(Peltandra sagittifolia)*. The marshes provide habitat for one of the largest populations of American alligators *(Alligator mississippiensis)* of any North Carolina river or estuary. Nesting occurs in adjacent wetlands and small tributaries.

Sturgeon Creek Tidal Wetlands - Contain Tidal freshwater marshes.

HIGH QUALITY NATURAL COMMUNITIES:
East shore of Cape Fear River below Wilmington- Brackish Marsh, Small Depression Pocosin, Coastal Fringe Evergreen Forest.
Northern Eagle Island, west of site: Tidal freshwater marsh.

Other rare species:
North of Site -
Plants:
Pondspice *(Litsea aestivalis)* Federal Species of concern
Carolina Bishopweed *(Ptilimnium Sp 1)* State Candidate
Swamp Lily *(Crinum americanum)* State Candidate

Northeast of Site -
Animals:
Bluefin Killifish *(Lucania goodei)*, State listed Special Concern freshwater fish

Northwest of Site
Animals:
Dukes' Skipper [butterfly] *(Euphyes dukesi)* significantly rare
East of Site -
Animals:
Magnificent Ramshorn [mollusk]*(Planorbella magnifica)* significantly rare
Greenfield Ramshorn Snail [mollusk] *(Helisoma eucosmium)* significantly rare
Barrel floater [mollusk] *(Anodonta couperiana)* State Endangered;historical record
Least Killifish (Heterandria formosa) State Special Concern
Plants:
Venus flytrap *(Dionaea muscipula)* Federal Species of Concern

Southeast of Site

Animals:

Red-cockaded Woodpecker *(Picoides borealis)* Federally Endangered

Southwest of Site

Animals:

Black-necked stilt [bird] *(Himantopus mexicanus)* State significantly rare

Plant:

Feather-bristle beaksedge *(Rhynchospora oligantha)* State candidate

Showy Orchid *(Platanthera nivea)* State Threatened

Enclosed is the N.C. County Species List of rare species and natural communities that are known to occur in Brunswick and New Hanover counties. If suitable habitat for any of these species occurs in the project area, then those species may be present there. If it is necessary to be certain that this site does not contain rare species, a field survey would need to be conducted.

Contact me at the address below or call me at (919) 715-8703, if you have any questions or need further information.

Sincerely,

Susan Reece Giles
Information Specialist
Natural Heritage Program

/SMRG

Enclosure

NC NATURAL HERITAGE PROGRAM COUNTY SPECIES LIST COVER SHEET

The county species list from the NC Natural Heritage Program is a listing of the elements (rare species, natural communities, geologic features, and special animal habitats) known to occur in a county. The information on this printout is compiled from a variety of sources, including field surveys, museums and herbaria, literature, and personal communications. The Heritage Program's Biological and Conservation Database (BCD) is dynamic, with new records being added and old records being revised as new information is received. The BCD was developed and is being maintained using methodology developed by The Nature Conservancy. The enclosed list cannot be considered a definitive record of natural heritage elements, and it should not be considered a substitute for field surveys. When this information is used in any document, we request that the printout date be given and that the NC Natural Heritage Program be credited.

This cover sheet explains the four columns of status codes that are given on the right-hand side of the county list printout.

STATE PROTECTION

CODE	STATUS	CODE	STATUS
E	Endangered	P_	Proposed (E, T, or C)
T	Threatened	SR	Significantly Rare
SC	Special Concern	EX	Extirpated
C	Candidate	WL	Watch List

Plant statuses are determined by the Plant Conservation Program (NC Department of Agriculture) and the Natural Heritage Program (NC Department of Environment, Health, and Natural Resources). E, T, and SC species are protected by state law (Plant Protection and Conservation Act, 1979). C and SR designations indicate rarity and the need for population monitoring and conservation action. WL indicates a species not warranting active monitoring, but believed to of conservation concern.

Animal statuses that indicate state protection (E, T, and SC) are published in *Endangered Wildlife of North Carolina*, March 16, 1992, Nongame and Endangered Wildlife Program (NC Department of Environment, Health, and Natural Resources). SR and EX statuses are Natural Heritage Program designations. SR indicates rarity and the need for population monitoring and conservation action. WL indicates a species not warranting active monitoring, but believed to of conservation concern.

FEDERAL PROTECTION

This status is designated by the US Fish and Wildlife Service. Federally listed Endangered and Threatened species are protected under the provisions of the Endangered Species Act of 1973, as amended through the 100th Congress. Unless otherwise noted, definitions are taken from the *Federal Register*, Vol. 56, No. 225, November 21, 1991 (50 CFR Part 17).

CODE	STATUS	DEFINITION
E	Endangered	A taxon "in danger of extinction throughout all of a significant portion of its range."
T	Threatened	A taxon "likely to become an endangered species within the foreseeable future throughout all of a significant portion of its range."
P_	Proposed	A taxon proposed for official listing as endangered or threatened.
L_	Listed	A taxon officially listed as endangered or threatened.
C	Candidate	A taxon under consideration for which there is sufficient information to support listing. This category was formerly designated as a Candidate 1 (C1) species.
FSC	Federal Species of Concern	Formerly defined as a taxon under consideration for which there is insufficient information to support listing; formerly designated as a Candidate 2 (C2) species. Currently, the US Fish and Wildlife Service does not recognize this designation.
T(S/A)	-	In reference to the American alligator - this species is threatened due to similarity of appearance with other rare crocodilians and is listed for trade purposes. The species is no longer biologically endangered or threatened and is not subject to Section 7 consultation.

Please note that the US Fish and Wildlife Service no longer recognizes the following categories:

3A	Candidate 3A	A taxon formerly under consideration for listing, but for which there is "persuasive evidence of extinction."
3B	Candidate 3B	A taxon formerly under consideration for listing, but which current taxonomic understanding does not support as a distinct entity meeting the Endangered Species Act's definition of "species."
3C	Candidate 3C	A taxon formerly under consideration for listing, but which has been "proven to more abundant or widespread than previously believed and/or [which is] not subject to any identifiable threat."

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
DUNE GRASS	-	-	S3	G3G4
INTERDUNE POND	-	-	S1	G2?
MARITIME DRY GRASSLAND	-	-	S2	G3
MARITIME SHRUB	-	-	S3	G4
NONRIVERINE SWAMP FOREST	-	-	S3	G2G3
PEATLAND ATLANTIC WHITE CEDAR FOREST	-	-	S2	G2
PINE SAVANNA	-	-	S2	G3
PINE/SCRUB OAK SANDHILL	-	-	S3	G4
POND PINE WOODLAND	-	-	S4	G4G5
SALT FLAT	-	-	S4	G5
SALT MARSH	-	-	S5	G5
SALT SHRUB	-	-	S4	G5
SMALL DEPRESSION POCOSIN	-	-	S1?	G2?
SMALL DEPRESSION POND	-	-	S2	G3
STREAMHEAD POCOSIN	-	-	S3	G4
TIDAL CYPRESS--GUM SWAMP	-	-	S3	G4
TIDAL FRESHWATER MARSH	-	-	S3	G4
VERNAL POOL	-	-	S2	G3
WET PINE FLATWOODS	-	-	S3	G3G4
XERIC SANDHILL SCRUB	-	-	S4	G5
Geologic features				
BARRIER ISLAND-SIMPLE	-	-		
CENOZOIC FOSSIL	-	-		
RIDGE & SWALE	-	-		
Special animal habitats				
GULL*TERN*SKIMMER COLONY COLONIAL WATERBIRDS NESTING SITE	-	-		
WADING BIRD ROOKERY	-	-		

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
MESIC PINE FLATWOODS	-	-	S3	G5
OXBOW LAKE	-	-	S3	G5
PIEDMONT/COASTAL PLAIN ACIDIC CLIFF	-	-	S2?	G4
PINE SAVANNA	-	-	S2	G3
PINE/SCRUB OAK SANDHILL	-	-	S3	G4
POND PINE WOODLAND	-	-	S4	G4G5
SALT FLAT	-	-	S4	G5
SALT MARSH	-	-	S5	G5
SAND AND MUD BAR	-	-	S5	G5
SMALL DEPRESSION POCOSIN	-	-	S1?	G2?
SMALL DEPRESSION POND	-	-	S2	G3
TIDAL CYPRESS--GUM SWAMP	-	-	S3	G4
TIDAL FRESHWATER MARSH	-	-	S3	G4
VERNAL POOL	-	-	S2	G3
WET PINE FLATWOODS	-	-	S3	G3G4
XERIC SANDHILL SCRUB	-	-	S4	G5
Geologic features				
BARRIER ISLAND-COMPLEX	-	-		
SINKHOLE	-	-		
SPRING	-	-		
Special animal habitats				
GULL*TERN*SKIMMER COLONY COLONIAL WATERBIRDS NESTING SITE	-	-		
OSPREY NESTING AREA	-	-		
WADING BIRD ROOKERY	-	-		

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
POLYGALA HOOKERI HOOKER'S MILKWORT	C	-	S2	G3
*POLYGONUM GLAUCUM SEABEACH KNOTWEED	C	-	S1	G3
**PTEROGLOSSASPIS ECRISTATA SPIKED MEDUSA (= EULOPHIA)	E	FSC	S1	G2G3
PTILIMNIUM COSTATUM RIBBED BISHOP-WEED	C	-	S1	G3G4
PTILIMNIUM SP 1 CAROLINA BISHOPWEED	C	-	S1	G2
RHEXIA CUBENSIS WEST INDIES MEADOW-BEAUTY	SR	-	S1	G4G5
RHYNCHOSPORA PLEIANTHA COASTAL BEAKSEDGE	C	-	S1	G3
RHYNCHOSPORA SCIRPOIDES LONG-BEAK BALDSEDGE	SR	-	S2	G4
RHYNCHOSPORA TRACYI TRACY'S BEAKSEDGE	SR	-	S2	G4
*SALVIA AZUREA AZURE SAGE	SR	-	SH	G4G5
SCLERIA GEORGIANA GEORGIA NUTRUSH	SR	-	S2	G4
SCLERIA RETICULARIS NETTED NUTRUSH	SR	-	S2	G4
SIDEROXYLON TENAX TOUGH BUMELIA	C	-	S1	G3?
SOLIDAGO TORTIFOLIA TWISTED-LEAF GOLDENROD	SR	-	SH	G4G5
*SOLIDAGO VERNA SPRING-FLOWERING GOLDENROD	E/PT	FSC	S3	G3
STYLISMA PICKERINGII VAR PICKERINGII PICKERING'S DAWNFLOWER	E	FSC	S2	G4?T2T
**THALICTRUM COOLEYI COOLEY'S MEADOWRUE	E	LE	S1	G1
TOFIELDIA GLABRA CAROLINA ASPHODEL	C	FSC	S3	G3
TRICHOSTEMA SP 1 DUNE BLUECURLS	C	FSC	S2	G2
*TRIFOLIUM CAROLINIANUM CAROLINA CLOVER	C	-	SH	G5
UTRICULARIA OLIVACEA DWARF BLADDERWORT	T	-	S2	G4
XYRIS FLABELLIFORMIS SAVANNA YELLOW-EYED-GRASS	C	-	S1	G4
Natural communities				
BRACKISH MARSH	-	-	S5	G5
COASTAL FRINGE EVERGREEN FOREST	-	-	S1	G3?
COASTAL FRINGE SANDHILL	-	-	S1	G3?
CYPRESS SAVANNA	-	-	S1	G2?
DRY-MESIC OAK--HICKORY FOREST	-	-	S5	G5

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
New Hanover				
Vertebrates				
ACIPENSER BREVIROSTRUM SHORTNOSE STURGEON	E	LE	S1	G3
ALLIGATOR MISSISSIPPIENSIS AMERICAN ALLIGATOR	T	T(S/A)	S3	G5
CARETTA CARETTA LOGGERHEAD TURTLE	T	LT	S2B,S2N	G3
CHARADRIUS MELODUS PIPING PLOVER	T	LT	S2B,S2N	G3
CHELONIA MYDAS GREEN TURTLE	T	LT	S1B,SZN	G3
COLUMBINA PASSERINA COMMON GROUND-DOVE	SR	-	SHB,SZN	G5
CONDYLURA CRISTATA POP 1 STAR-NOSED MOLE - EASTERN NC POPULATION	SC	-	S2	G5T2Q
COTURNICOPS NOVEBORACENSIS YELLOW RAIL	SR	-	S2N	G4
CROTALUS ADAMANTEUS EASTERN DIAMONDBACK RATTLESNAKE	SR	-	S1	G5
EGRETTA CAERULEA LITTLE BLUE HERON	SC	-	S3B,S3N	G5
EGRETTA THULA SNOWY EGRET	SC	-	S3B,S3N	G5
EGRETTA TRICOLOR TRICOLORED HERON	SC	-	S3B,S3N	G5
ELEOTRIS PISONIS SPINYCHEEK SLEEPER	SR	-	S2	G5
EVORTHODUS LYRICUS LYRE GOBY	SR	-	S2	GU
HETERANDRIA FORMOSA LEAST KILLIFISH	SC	-	S1	G5
*HETERODON SIMUS SOUTHERN HOGNOSE SNAKE	SR	FSC	S3	G4G5
HYPSOBLENNIUS IONTHAS FRECKLED BLENNY	SR	-	S2	GU
*LANIUS LUDOVICIANUS LUDOVICIANUS LOGGERHEAD SHRIKE	SC	-	S3B,S3N	G5T5
LUCANIA GOODEI BLUEFIN KILLIFISH	SC	-	S1	G5
MICRURUS FULVIUS EASTERN CORAL SNAKE	SR	-	S1	G5
MYOTIS AUSTRORIPARIUS SOUTHEASTERN MYOTIS	SC	FSC	S2?	G4
OPHISAURUS MIMICUS MIMIC GLASS LIZARD	SC	FSC	S2	G3
*PASSERINA CIRIS CIRIS EASTERN PAINTED BUNTING	SR	FSC	S3B,SZN	G5TU
PELECANUS OCCIDENTALIS BROWN PELICAN	SC	-	S3B,S4N	G4
PICOIDES BOREALIS RED-COCKADED WOODPECKER	E	LE	S2	G3
*PITUOPHIS MELANOLEUCUS MELANOLEUCUS NORTHERN PINE SNAKE	SC	FSC	S3	G5T4

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
PLEGADIS FALCINELLUS GLOSSY IBIS	SC	-	S2B,S1N	G5
RANA CAPITO CAPITO CAROLINA GOPHER FROG	SC	FSC	S2	G4T3
RYNCHOPS NIGER BLACK SKIMMER	SC	-	S3B,S3N	G5
SCIURUS NIGER EASTERN FOX SQUIRREL	SR	-	S3	G5
TADARIDA BRASILIENSIS BRAZILIAN FREE-TAILED BAT	SC	-	SUB,S2N	G5
TRICHECHUS MANATUS MANATEE	E	LE	S1N	G2?
Invertebrates				
*AMBLYSCIRTES ALTERNATA LEAST FLORIDA SKIPPER	SR	-	S2?	G3G4
*ANODONTA COUPERIANA BARREL FLOATER	E	-	S1	G3G4
*ATRYTONE AROGOS AROGOS AROGOS SKIPPER	SR	FSC	S1	G4T1T2
*ATRYTONOPSIS LOAMMI LOAMMI SKIPPER	SR	-	S1?	G2G4Q
HELISOMA EUCOSMIUM GREENFIELD RAMSHORN SNAIL	SR	-	S1	G1?
PAPILIO CRESPHONTES GIANT SWALLOWTAIL	SR	-	S2?	G5
PHYCIODES PHAON PHAON CRESCENT	SR	-	S2?	G5
PLANORBELLA MAGNIFICA MAGNIFICENT RAMS-HORN	E	FSC	S1	G1
PROBLEMA BULENTA RARE SKIPPER	SR	FSC	S1?	G2G3
*PROBLEMA BYSSUS BYSSUS SKIPPER	SR	-	S2?	G3G4
PROCAMBARUS PLUMIMANUS CROATAN CRAYFISH	SR	FSC	S2?	G2
TRIODOPSIS SOELNERI CAPE FEAR THREETOOTH	T	FSC	S2	G2
Vascular plants				
*AGALINIS APHYLLA SCALE-LEAF GERARDIA	C	-	S2	G3G4
AGALINIS LINIFOLIA FLAXLEAF GERARDIA	SR	-	S3	G4?
AGALINIS VIRGATA BRANCHED GERARDIA	SR	-	S2	G3G4
AMARANTHUS PUMILUS SEABEACH AMARANTH	T	LT	S2	G2
*AMORPHA GEORGIANA VAR CONFUSA SAVANNA INDIGO-BUSH (= CAROLINA LEADPLANT)	T	FSC	S2	G3T2
ASCLEPIAS PEDICELLATA SAVANNA MILKWEED	C	-	S2	G3?
ASTRAGALUS MICHAUXII SANDHILLS MILKVETCH	C	FSC	S3	G3

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
*BACOPA INNOMINATA A WATER-HYSSOP	C	-	SH	G5
*CAREX DECOMPOSITA CYPRESS KNEE SEDGE	SR	-	S1	G4
CAREX VERRUCOSA WARTY SEDGE	SR	-	S1	G3G4
CRINUM AMERICANUM SWAMP-LILY	C	-	SH	G5
CYPERUS LECONTEI LECONTE'S FLATSEDGE	SR	-	S1	G4?
*CYPERUS TETRAGONUS FOUR-ANGLED FLATSEDGE	SR	-	S2	G4?
DIONAEA MUSCIPULA VENUS FLYTRAP	C-SC	FSC	S3	G3
ELEOCHARIS ROBBINSII ROBBINS'S SPIKERUSH	C	-	S2	G4G5
ERYTHRINA HERBACEA CORALBEAN	SR	-	S1	G5
EUPATORIUM LEPTOPHYLLUM LIMESINK DOG-FENNEL	C	-	S1	G4G5
GELSEMIUM RANKINII SWAMP JESSAMINE	SR	-	S2	G5
*HELENIUM PINNATIFIDUM DISSECTED SNEEZEWEED	SR	-	S2	G4
HELIANTHEMUM GEORGIANUM GEORGIA SUNROSE	C	-	S1	G4
*HIBISCUS ACULEATUS COMFORTROOT	C	-	S1	G4G5
**HYPERICUM ADPRESSUM BOG ST. JOHN'S-WORT	C	FSC	SH	G2G3
LACHNOCAULON BEYRICHIANUM SOUTHERN BOGBUTTON	SR	-	S2S3	G2G3
LILAEOPSIS CAROLINENSIS CAROLINA GRASSWORT	T	-	S3	G3
LITSEA AESTIVALIS PONDSPICE	C	FSC	S2	G3
LOPHIOLA AUREA GOLDEN CREST	E	-	S1	G4
LUDWIGIA ALATA WINGED SEEDBOX	SR	-	S2	G3G4
*LUDWIGIA LANCEOLATA LANCELEAF SEEDBOX	C	-	S1	G3
LUDWIGIA LINIFOLIA FLAXLEAF SEEDBOX	SR	-	S2	G4
LUDWIGIA SUFFRUTICOSA SHRUBBY SEEDBOX	SR	-	S2	G5
LYSIMACHIA ASPERULIFOLIA ROUGH-LEAF LOOSESTRIFE	E	E	S3	G3
PANICUM TENERUM SOUTHEASTERN PANIC GRASS	SR	-	S2	G4
PELTANDRA SAGITTIFOLIA SPOONFLOWER	SR	-	S2	G3G4
PLATANTHERA NIVEA SNOWY ORCHID	T	-	S1	G5

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
Brunswick				
Vertebrates				
ACIPENSER BREVIROSTRUM SHORTNOSE STURGEON	E	LE	S1	G3
AIMOPHILA AESTIVALIS BACHMAN'S SPARROW	SC	FSC	S3B,S2N	G3
ALLIGATOR MISSISSIPPIENSIS AMERICAN ALLIGATOR	T	T(S/A)	S3	G5
AMMODRAMUS HENSLOWII HENSLOW'S SPARROW	SR	FSC	S2B,S1N	G3G4
ANHINGA ANHINGA ANHINGA	SR	-	S2B,SZN	G5
CARETTA CARETTA LOGGERHEAD TURTLE	T	LT	S2B,S2N	G3
CHARADRIUS MELODUS PIPING PLOVER	T	LT	S2B,S2N	G3
CHELONIA MYDAS GREEN TURTLE	T	LT	S1B,SZN	G3
COLUMBINA PASSERINA COMMON GROUND-DOVE	SR	-	SHB,SZN	G5
CONDYLURA CRISTATA POP 1 STAR-NOSED MOLE - EASTERN NC POPULATION	SC	-	S2	G5T2Q
CROTALUS ADAMANTEUS EASTERN DIAMONDBACK RATTLESNAKE	SR	-	S1	G5
DERMOCHELYS CORIACEA LEATHERBACK TURTLE	E	LE	SZN	G3
EGRETTA CAERULEA LITTLE BLUE HERON	SC	-	S3B,S3N	G5
EGRETTA THULA SNOWY EGRET	SC	-	S3B,S3N	G5
EGRETTA TRICOLOR TRICOLORED HERON	SC	-	S3B,S3N	G5
ELASSOMA BOEHLKEI CAROLINA PYGMY SUNFISH	T	FSC	S1S2	G2
ELEOTRIS PISONIS SPINYCHEEK SLEEPER	SR	-	S2	G5
FALCO PEREGRINUS PEREGRINE FALCON	E	LE	S1B,S2N	G4
FELIS CONCOLOR COUGUAR EASTERN COUGAR	E	LE	SH	G5TH
GOBIONELLUS STIGMATICUS MARKED GOBY	SR	-	S2	G?
HALIAEETUS LEUCOCEPHALUS BALD EAGLE	E	LT	S1B,S2N	G4
*HETERODON SIMUS SOUTHERN HOGNOSE SNAKE	SR	FSC	S3	G4G5
HIMANTOPUS MEXICANUS BLACK-NECKED STILT	SR	-	S2B	G5
HYPSOBLENNIUS IONTHAS FRECKLED BLENNY	SR	-	S2	GU
LANIUS LUDOVICIANUS LUDOVICIANUS LOGGERHEAD SHRIKE	SC	-	S3B,S3N	G5T5
LEPIDOCHELYS KEMPII ATLANTIC RIDLEY (TURTLE)	E	LE	SAB,SZN	G1

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
MICROPHIS BRACHYURUS OPOSSUM PIPEFISH	SR	-	S1	G5
MICRURUS FULVIUS EASTERN CORAL SNAKE	SR	-	S1	G5
MYCTERIA AMERICANA WOOD STORK	E	LE	S1N	G4
NEOTOMA FLORIDANA FLORIDANA EASTERN WOODRAT	T	-	S1	G5T5
NOTURUS SP 2 BROADTAIL MADTOM	SC	-	S2	G2
OPHISAURUS MIMICUS MIMIC GLASS LIZARD	SC	FSC	S2	G3
*PASSERINA CIRIS CIRIS EASTERN PAINTED BUNTING	SR	FSC	S3B,SZN	G5TU
PELECANUS OCCIDENTALIS BROWN PELICAN	SC	-	S3B,S4N	G4
PICOIDES BOREALIS RED-COCKADED WOODPECKER	E	LE	S2	G3
*PITUOPHIS MELANOLEUCUS MELANOLEUCUS NORTHERN PINE SNAKE	SC	FSC	S3	G5T4
PLEGADIS FALCINELLUS GLOSSY IBIS	SC	-	S2B,S1N	G5
PORPHYRULA MARTINICA PURPLE GALLINULE	SR	-	SHB	G5
RANA CAPITO CAPITO CAROLINA GOPHER FROG	SC	FSC	S2	G4T3
RYNCHOPS NIGER BLACK SKIMMER	SC	-	S3B,S3N	G5
STERNA NILOTICA GULL-BILLED TERN	T	-	S3B,SZN	G5
TRICHECHUS MANATUS MANATEE	E	LE	S1N	G2?
URSUS AMERICANUS BLACK BEAR	SR	-	S3	G5
Invertebrates				
AGROTIS BUCHHOLZI BUCHHOLZ'S DART MOTH	SR	FSC	S2S3	G2G3
AMBLYSCIRTES ALTERNATA LEAST FLORIDA SKIPPER	SR	-	S2?	G3G4
*AMBLYSCIRTES REVERSA REVERSED ROADSIDE SKIPPER	SR	-	S3?	G4
**ATRYTONE AROGOS AROGOS AROGOS SKIPPER	SR	FSC	S1	G4T1T2
*ATRYTONOPSIS LOAMMI LOAMMI SKIPPER	SR	-	S1?	G2G4Q
CALEPHELIS VIRGINIENSIS LITTLE METALMARK	SR	-	S3?	G4
ELLIPTIO FOLLICULATA POD LANCE	SC	-	S2	G3
ELLIPTIO WACCAMAWENSIS WACCAMAW SPIKE	T	FSC	S1	G1G2Q

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
*ERYNNIS MARTIALIS MOTTLED DUSKY WING	SR	-	S3?	G4
EUAGROTIS LUBRICANS SLIPPERY DART MOTH	SR	-	S3?	G4
*EUPHYES BIMACULA TWO-SPOTTED SKIPPER	SR	-	S2?	G4
EUPHYES DUKESI DUKES' SKIPPER	SR	-	S2?	G3
*FIXSENIA FAVONIUS FAVONIUS SOUTHERN HAIRSTREAK	SR	-	S2S3	G4T4
HELISOMA EUCOSMIUM GREENFIELD RAMSHORN SNAIL	SR	-	S1	G1?
*HESPERIA ATTALUS SLOSSONAE DOTTED SKIPPER	SR	-	S2S3	G4T3
INCISALIA IRUS FROSTED ELFIN	SR	-	S3?	G4
LIGUMIA NASUTA EASTERN PONDMUSSEL	SC	-	S2	G4
METARRANTHIS LATERITIARIA (OF GUENEE) AN INCHWORM MOTH	SR	-	S1S3	G3G4
MITOURA HESSELI HESSEL'S HAIRSTREAK	SR	-	S2?	G3G4
PAPILIO CRESPHONTES GIANT SWALLOWTAIL	SR	-	S2?	G5
*PHYCIODES PHAON PHAON CRESCENT	SR	-	S2?	G5
PLANORBELLA MAGNIFICA MAGNIFICENT RAMS-HORN	E	FSC	S1	G1
PROBLEMA BULENTA RARE SKIPPER	SR	FSC	S1?	G2G3
PROBLEMA BYSSUS BYSSUS SKIPPER	SR	-	S2?	G3G4
SATYRIUM KINGI KING'S HAIRSTREAK	SR	-	S2S3	G3G4
SPARTINIPHAGA CARTERAE CARTER'S SPARTINIPHAGA	SR	FSC	S2S3	G2G3
TRIODOPSIS SOELNERI CAPE FEAR THREETOOTH	T	FSC	S2	G2
VILLOSA DELUMBIS EASTERN CREEKSHELL	SR	-	S3?	G3G4
Vascular plants				
AGALINIS APHYLLA SCALE-LEAF GERARDIA	C	-	S2	G3G4
AGALINIS LINIFOLIA FLAXLEAF GERARDIA	SR	-	S3	G4?
AGALINIS VIRGATA BRANCHED GERARDIA	SR	-	S2	G3G4
ALLIUM SP 1 SAVANNA ONION	C	-	S1	G1
AMARANTHUS PUMILUS SEABEACH AMARANTH	T	LT	S2	G2
AMORPHA GEORGIANA VAR CONFUSA SAVANNA INDIGO-BUSH (= CAROLINA LEADPLANT)	T	FSC	S2	G3T2

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
ANDROPOGON MOHRII BOG BLUESTEM	C	-	S1	G4?
ARNOGLOSSUM OVATUM SAVANNA INDIAN-PLANTAIN	SR	-	S1	G4G5
ASCLEPIAS PEDICELLATA SAVANNA MILKWEED	C	-	S2	G3?
BACCHARIS GLOMERULIFLORA SILVERLING	C	-	S1	G4
BALDUINA ATROPURPUREA HONEYCOMB HEAD	C	FSC	SH	G2G3
BULBOSTYLIS WAREI WARE'S HAIRSEDGE	C	-	SH	G3G4
*CALAMINTHA GEORGIANA GEORGIA CALAMINT	SR	-	S1	G5
CAREX DECOMPOSITA CYPRESS KNEE SEDGE	SR	-	S1	G4
CAREX VERRUCOSA WARTY SEDGE	SR	-	S1	G3G4
*CYPERUS DENTATUS TOOTHED FLATSEDGE	C	-	SH	G4
CYPERUS LECONTEI LECONTE'S FLATSEDGE	SR	-	S1	G4?
CYPERUS TETRAGONUS FOUR-ANGLED FLATSEDGE	SR	-	S2	G4?
DICHANTHELIUM NEURANTHUM NERVE-FLOWERED WITCH GRASS	C	-	S1	G5?
DIONAEA MUSCIPULA VENUS FLYTRAP	C-SC	FSC	S3	G3
DROSERA FILIFORMIS THREADLEAF SUNDEW	SR	-	S1	G5
ECHINODORUS PARVULUS DWARF BURHEAD	C	FSC	S1	G3
ELEOCHARIS ELONGATA FLORIDA SPIKERUSH	C	-	S1	G5?
ELEOCHARIS ROBBINSII ROBBINS'S SPIKERUSH	C	-	S2	G4G5
ELEOCHARIS ROSTELLATA BEAKED SPIKERUSH	SR	-	S2	G5
ERIOCAULON AQUATICUM SEVEN-ANGLED PIPEWORT	SR	-	S2	G5
ERYTHRINA HERBACEA CORALBEAN	SR	-	S1	G5
EUPATORIUM LEPTOPHYLLUM LIMESINK DOG-FENNEL	C	-	S1	G4G5
FIMBRISTYLIS PERPUSILLA HARPER'S FIMBRY	T	FSC	S1	G2G3
GALACTIA MOLLIS SOFT MILK-PEA	C	-	S2	G4G5
GELSEMIUM RANKINII SWAMP JESSAMINE	SR	-	S2	G5
HELENIUM BREVIFOLIUM LITTLELEAF SNEEZEWEED	C/PE	-	S1	G3G4
HELENIUM PINNATIFIDUM DISSECTED SNEEZEWEED	SR	-	S2	G4
HELENIUM VERNALE	SR	-	S1	G4?

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
SPRING SNEEZEWEED				
HELIANTHEMUM CORYMBOSUM PINEBARREN SUNROSE	SR	-	S1	G4G5
HELIANTHEMUM GEORGIANUM GEORGIA SUNROSE	C	-	S1	G4
HYPERICUM NITIDUM CAROLINA ST. JOHN'S-WORT	SR	-	S1	G4
ILEX AMELANCHIER SARVIS HOLLY	SR	-	S3	G4
IPOMOEA IMPERATI BEACH MORNING-GLORY	SR	-	S1	G5
LACHNOCAULON BEYRICHIANUM SOUTHERN BOGBUTTON	SR	-	S2S3	G2G3
LECHEA TORREYI TORREY'S PINWEED	C	-	S1	G4G5
LEPTOCHLOA FASCICULARIS VAR MARITIMA LONG-AWNED SPANGLETOP	SR	-	S1	G5T3
LILAEOPSIS CAROLINENSIS CAROLINA GRASSWORT	T	-	S3	G3
LINUM FLORIDANUM VAR CHRYSOCARPUM YELLOW-FRUITED FLAX	SR	-	S1	G4T3?
LITSEA AESTIVALIS PONDSPICE	C	FSC	S2	G3
LOPHIOLA AUREA GOLDEN CREST	E	-	S1	G4
LUDWIGIA ALATA WINGED SEEDBOX	SR	-	S2	G3G4
LUDWIGIA LANCEOLATA LANCELEAF SEEDBOX	C	-	S1	G3
LUDWIGIA LINIFOLIA FLAXLEAF SEEDBOX	SR	-	S2	G4
LUDWIGIA SUFFRUTICOSA SHRUBBY SEEDBOX	SR	-	S2	G5
LYSIMACHIA ASPERULIFOLIA ROUGH-LEAF LOOSESTRIFE	E	LE	S3	G3
MACBRIDEA CAROLINIANA CAROLINA BOGMINT	C	FSC	S2	G2G3
MALAXIS SPICATA FLORIDA ADDER'S MOUTH	SR	-	S1	G4?
MUHLENBERGIA TORREYANA PINEBARREN SMOKEGRASS	E	-	S1	G3
MYRIOPHYLLUM LAXUM LOOSE WATERMILFOIL	T	FSC	S1	G3
OLDENLANDIA BOSCII BOSC'S BLUET	SR	-	S1	G5
PANICUM TENERUM SOUTHEASTERN PANIC GRASS	SR	-	S2	G4
PARNASSIA CAROLINIANA CAROLINA GRASS-OF-PARNASSUS	E	FSC	S2	G3
PARNASSIA GRANDIFOLIA LARGE-LEAVED GRASS-OF-PARNASSUS	C/PT	-	S1	G3G4
PASPALUM DISSECTUM MUDBANK CROWN GRASS	SR	-	S1	G4?
PELTANDRA SAGITTIFOLIA SPOONFLOWER	SR	-	S2	G3G4

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
Nonvascular plants				
*CAMPYLOPUS CAROLINAE SAVANNA CAMPYLOPUS	C	FSC	S1	G1
CHEILOLEJEUNEA RIGIDULA A LIVERWORT	SR	-	S2	G5
LEJEUNEA BERMUDIANA A LIVERWORT	SR	-	SH	G3G4
PLAGIOCHILA LUDOVICIANA A LIVERWORT	SR	-	S1	G5
SPHAGNUM FITZGERALDII FITZGERALD'S PEATMOSS	SR	-	S2S3	G2G3
SYRRHOPODON INCOMPLETUS CUBAN SCHLIESSMUND	C	-	S1	G5
TELOSCHISTES FLAVICANS SUNRISE LICHEN	SR	-	S1	G3G4
Natural communities				
BAY FOREST	-	-	S3?	G3G4?
BRACKISH MARSH	-	-	S5	G5
COASTAL FRINGE EVERGREEN FOREST	-	-	S1	G3?
COASTAL FRINGE SANDHILL	-	-	S1	G3?
COASTAL PLAIN BOTTOMLAND HARDWOODS (BLACKWATE -	-	-	S3	G5T5
COASTAL PLAIN LEVEE FOREST (BROWNWATER SUBTYP -	-	-	S4	G5T5
COASTAL PLAIN SEMIPERMANENT IMPOUNDMENT	-	-	S4	G5
COASTAL PLAIN SMALL STREAM SWAMP (BLACKWATER	-	-	S5	G5
CYPRESS SAVANNA	-	-	S1	G2?
CYPRESS--GUM SWAMP (BLACKWATER SUBTYPE)	-	-	S5	G5T5
DRY-MESIC OAK--HICKORY FOREST	-	-	S5	G5
DUNE GRASS	-	-	S3	G3G4
HIGH POCOSIN	-	-	S4	G4
INTERDUNE POND	-	-	S1	G2?
LOW POCOSIN	-	-	S3	G3
MARITIME EVERGREEN FOREST	-	-	S1	G2G3
MARITIME SHRUB	-	-	S3	G4
MARITIME WET GRASSLAND	-	-	S2?	G3?
MESIC MIXED HARDWOOD FOREST (COASTAL PLAIN SUBTYPE)	-	-	S4	G5T5

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
PITYOPSIS GRAMINIFOLIA VAR GRAMINIFOLIA A SILKGRASS	SR	-	S1?	G5T4
PLANTAGO SPARSIFLORA PINELAND PLANTAIN	E	FSC	S1	G2
PLATANTHERA INTEGRA YELLOW FRINGELESS ORCHID	T	-	S1	G4
PLATANTHERA NIVEA SNOWY ORCHID	T	-	S1	G5
POLYGALA HOOKERI HOOKER'S MILKWORT	C	-	S2	G3
POLYGONUM GLAUCUM SEABEACH KNOTWEED	C	-	S1	G3
POLYGONUM HIRSUTUM HAIRY SMARTWEED	SR	-	S1	G4G5
PONTHIEVA RACEMOSA SHADOW-WITCH	SR	-	S2	G4G5
PTILIMNIUM SP 1 CAROLINA BISHOPWEED	C	-	S1	G2
RHEXIA ARISTOSA AWNED MEADOW-BEAUTY	T	FSC	S3	G3
RHEXIA CUBENSIS WEST INDIES MEADOW-BEAUTY	SR	-	S1	G4G5
RHYNCHOSPORA ALBA NORTHERN WHITE BEAKSEDGE	C	-	S2	G5
RHYNCHOSPORA BREVISETA SHORT-BRISTLED BEAKSEDGE	C	-	S1	G3G4
RHYNCHOSPORA DECURRENS SWAMP FOREST BEAKSEDGE	C	FSC	S1	G3G4
RHYNCHOSPORA DIVERGENS WHITE-SEEDED BEAKSEDGE	SR	-	S1	G4
RHYNCHOSPORA GLOBULARIS VAR PINETORUM SMALL'S BEAKSEDGE	SR	-	S1	G5T3?
RHYNCHOSPORA HARPERI HARPER'S BEAKSEDGE	C	-	S1	G3
RHYNCHOSPORA ODORATA FRAGRANT BEAKSEDGE	SR	-	S1	G4
RHYNCHOSPORA OLIGANTHA FEATHER-BRISTLE BEAKSEDGE	C	-	S2S3	G4
RHYNCHOSPORA PLEIANTHA COASTAL BEAKSEDGE	C	-	S1	G3
RHYNCHOSPORA SCIRPOIDES LONG-BEAK BALDSEDGE	SR	-	S2	G4
RHYNCHOSPORA THORNEI THORNE'S BEAKSEDGE	C/PE	FSC	S1	G1
RHYNCHOSPORA TRACYI TRACY'S BEAKSEDGE	SR	-	S2	G4
SABAL PALMETTO CABBAGE PALM	SR	-	S1	G5
SABATIA KENNEDYANA PLYMOUTH GENTIAN	T-SC	-	S1	G3
SAGITTARIA ISOETIFORMIS QUILLWORT ARROWHEAD	SR	-	S1	G3G4
SARRACENIA MINOR HOODED PITCHER PLANT	SR	-	S2	G4G5
SCHOENOPLECTUS ETUBERCULATUS	SR	-	S3	G3G4

SCIENTIFIC AND COMMON NAME	STATE PROT.	FED. PROT.	STATE RANK	GLOBAL RANK
CANBY'S BULRUSH				
SCIRPUS LINEATUS	C	-	S2	G4
DROOPING BULRUSH				
SCLERIA BALDWINII	C	-	S1	G4
BALDWIN'S NUTRUSH				
SCLERIA GEORGIANA	SR	-	S2	G4
GEORGIA NUTRUSH				
SCLERIA RETICULARIS	SR	-	S2	G4
NETTED NUTRUSH				
*SCLERIA VERTICILLATA	C	-	S1	G5
SAVANNA NUTRUSH				
SEYMERIA PECTINATA	C	-	SH	G4G5
STICKY AFZELIA				
SIDEROXYLON TENAX	C	-	S1	G3?
TOUGH BUMELIA				
SOLIDAGO GRACILLIMA	SR	-	S1S2	G4?
GRACEFUL GOLDENROD				
SOLIDAGO PULCHRA	E	FSC	S3	G3
CAROLINA GOLDENROD				
*SOLIDAGO TORTIFOLIA	SR	-	SH	G4G5
TWISTED-LEAF GOLDENROD				
SOLIDAGO VERNA	E/PT	FSC	S3	G3
SPRING-FLOWERING GOLDENROD				
SPIRANTHES LACINIATA	C	-	S1	G4G5
LACE-LIP LADIES'-TRESSES				
SPIRANTHES LONGILABRIS	C	-	S1	G3
GIANT SPIRAL ORCHID				
SPOROBOLUS TERETIFOLIUS SENSU STRICTO	T	FSC	S1	G1G2
WIRELEAF DROPSEED				
SPOROBOLUS VIRGINICUS	SR	-	S1	G5
SALTMARSH DROPSEED				
STYLISMA AQUATICA	SR	-	S1	G4
WATER DAWNFLOWER				
THALICTRUM COOLEYI	E	LE	S1	G1
COOLEY'S MEADOWRUE				
TOFIELDIA GLABRA	C	FSC	S3	G3
CAROLINA ASPHODEL				
TRICHOSTEMA SP 1	C	FSC	S2	G2
DUNE BLUECURLS				
TRIDENS CAROLINIANUS	C	-	S3	G3?
CAROLINA TRIODIA				
UTRICULARIA OLIVACEA	T	-	S2	G4
DWARF BLADDERWORT				
VACCINIUM MACROCARPON	C	-	S2	G4
CRANBERRY				
XYRIS BREVIFOLIA	SR	-	S2	G4G5
SHORTLEAF YELLOW-EYED-GRASS				
XYRIS ELLIOTTII	SR	-	S1	G4
ELLIOTT'S YELLOW-EYED-GRASS				
XYRIS FLABELLIFORMIS	C	-	S1	G4
SAVANNA YELLOW-EYED-GRASS				
YUCCA GLORIOSA	SR	-	S2?	G4?
MOUNDLILY YUCCA				
ZEPHYRANTHES SP 1	C	-	S2?	G2?
CAROLINA ATAMASCO LILY				

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

U.S. EPA
Old ATC Refinery
Potential locations of American alligators
on the Cape Fear River

BVWS Project 52013.310
BVWS File SA
May 5, 1995
1:00 pm

To: Randy Wilson
Company: North Carolina Department of Fish and Game
Division of Wildlife and Endangered Species
Phone No.: (910) 733-7291

Recorded by: Kem Reliford

Randy Wilson stated that sightings of American alligators have occurred on the east side of the Cape Fear River near Alligator Creek; the east bank as well as the west bank of the Cape Fear River are known habitats for the American alligator.

Reference 38

ENDANGERED & THREATENED SPECIES

of the SOUTHEAST UNITED STATES

"The Red Book"

REGION 4

ATLANTA

GEORGIA

S380391

ENDANGERED AND THREATENED SPECIES

OF THE

SOUTHEASTERN UNITED STATES

(THE RED BOOK)

Introduction Section, Volume 1

Prepared by:

U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

January 1992

Availability Unlimited
For Sale by Superintendent of Documents
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Pittsburgh, PA 15250-7954

Stock Order Number: 924-003-00000-6

6/30/93

Federally Listed Species by State

NORTH CAROLINA

(E = Endangered; T = Threatened; CH = Critical Habitat determined

Mammals	General Distribution
Bat, gray (*Myotis grisescens*) - E	Extreme Southwest
Bat, Indiana (*Myotis sodalis*) - E	West
Bat, Virginia big-eared (*Plecotus townsendii virginianus*) - E	Avery County
Cougar, eastern (*Felis concolor couguar*) - E	Entire State
Manatee, West Indian (*Trichechus manatus*) - E	Coastal waters
Shrew, Dismal Swamp southeastern (*Sorex longirostris fisheri*) - T	Dismal Swamp; Camden, Gates, Pasquotank, and Perquimans Counties
Squirrel, Carolina northern flying (*Glaucomys sabrinus coloratus*) - E	Western mountains (Yancy, Buncombe, Haywood, Swain, and Mitchell Counties)
Whale, finback (*Balaenoptera physalus*) - E	Coastal waters
Whale, humpback (*Megaptera novaeangliae*) - E	Coastal waters
Whale, right (*Balaena glacialis*) - E	Coastal waters
Whale, sei (*Balaenoptera borealis*) - E	Coastal waters
Whale, sperm (*Physeter catodon*) - E	Coastal waters
Wolf, red (*Canis rufus*) - E	Dare, Tyrrell Counties (Alligator River National Wildlife Refuge), Great Smoky Mountains National Park

Birds	
Eagle, bald (*Haliaeetus leucocephalus*) - E	Entire State
Falcon, American peregrine (*Falco peregrinus anatum*) - E	Western mountains
Falcon, Arctic peregrine (*Falco peregrinus tundrius*) - T	Entire State
Plover, piping (*Charadrius melodus*) - T	Coast
Stork, wood (*Mycteria americana*) - E	Coast
Tern roseate (*Sterna dougallii dougallii*) - E	Coast
Warbler, Bachman's (*Vermivora bachmanii*) - E	East
Warbler, Kirtland's (*Dendroica kirtlandii*) - E	Northwest, Central, Southeast
Woodpecker, ivory-billed (*Campephilus principalis*) - E	Southeast
Woodpecker, red-cockaded (*Picoides* [=*Dendrocopos*] *borealis*) - E	East

Reptiles	General Distribution
Alligator, American (Alligator mississippiensis) - T (S/A)*	Coastal plain
Turtle, Kemp's (Atlantic) ridley (Lepidochelys kempii) - E	Coastal waters
Turtle, green (Chelonia mydas) - T	Coastal waters
Turtle, hawksbill (Eretmochelys imbricata) - E	Coastal waters
Turtle, leatherback (Dermochelys coriacea) - E	Coastal waters
Turtle, loggerhead (Caretta caretta) - T	Coastal waters

Fishes	
Chub, spotfin (Hybopsis monacha) - T,CH	Little Tennessee River, Swain and Macon Counties
Shiner, Cape Fear (Notropis mekistocholas) - E,CH	Randolph, Moore, Lee, Harnett, and Chatham Counties
Silverside, Waccamaw (Menidia extensa) - T	Lake Waccamaw and Upper Waccamaw R., Columbus County
Sturgeon, shortnose (Acipenser brevirostrum) - E	Coastal rivers

Mollusks	
Mussel, Carolina heelsplitter (Lasmigona decorata) - E	Catawba River System, Waxhaw Creek, Union County; Goose Creek, Rocky River, in the Pee Dee River System, Union County
Mussel, dwarf wedge (Alasmidonta heterodon) - E	Little River, Johnston County; Tar River and two of its tributaries, Granville and Franklin Counties
Mussel, Tar River spiny (Elliptio [Canthyria] steinstansana) - E	Tar River, Edgecombe County; Sandy Creek, Franklin County; Swift Creek, Nash County
Snail, noonday (Mesodon clarki nantahala) - T	Swain County

*Alligators are biologically neither endangered nor threatened. For law enforcement purposes they are classified as "Threatened due to Similarity of Appearance." Alligator hunting is regulated in accordance with State law.

Plants	General Distribution
Amaranthus pumilus Seabeach amaranth - T	Atlantic coastal plain beaches
Echinacea laevigata (smooth coneflower) - E	Durham, Granville Counties
Cardamine micranthera (Small-anthered bittercress) - E	Stokes and Forsyth Counties
Geum radiatum (Spreading avens) - E	Ashe, Avery, Transylvania Watauga, Buncombe, and Yancey Counties
Hedyotis purpurea var. montana (Roan Mountain bluet) - E	Ashe, Watauga, Avery, and Mitchell Counties
Helianthus schweinitzii (Schweinitz's sunflower) - (E)	Stanly, Cabarrus, Union Mecklenberg, Rowan Counties
Helonias bullata (Swamp pink) - T	Jackson, Transylvania, Henderson Counties
Hexastylis maniflora (Dwarf-flowered heartleaf) - T	Cleveland, Catawba, Burke, Rutherford, and Lincoln Counties
Hudsonia montana (mountain golden heather) - T,CH	Burke and McDowell Counties
Isotria medeoloides (small whorled pogonia) - E	Macon and Henderson Counties
Liatris helleri (Heller's blazing star) - T	Ashe, Avery, Caldwell, Burke Counties
Lindera melissifolia (pondberry) - E	Bladen County
Lysimachia asperulaefolia (rough-leaved loosestrife) - E	Carteret, Scotland, Cumberland, Bladen, Brunswick, Pender, and Hoke, and Onslow Counties
Oxypolis canbyi (Canby's dropwort) - E	Scotland County
Ptilimnium nodosom (harperella) - E	Granville and Chatham Counties
Rhus michauxii (Michaux's sumac) - E	Davie, Durham, Franklin, Hoke, Johnston, Lincoln, Mecklenberg, Moore, Orange, Richmond, Robeson, Scotland, Wake, Wilson Counties
Sagittaria fasiculata (bunched arrowhead) - E	Henderson County

	General Distribution
Sarracenia oreophila (green pitcher plant) - E	Clay County
Sarracenia rubra ssp. *jonesii* (mountain sweet pitcher plant) - E	Henderson and Transylvania Counties
Schwalbea americana (American chaffseed) - E	Fort Bragg in Hoke County
Sisyrinchium dichotomum (white irisette) - E	Polk, Henderson, and Rutherford Counties
Solidago spithamaea (Blue Ridge goldenrod) - T	Avery and Mitchell Counties
Spirea virginiana (Virginia spiraea) - T	South Fork of the New River, Ashe County; Little Tennessee River, Macon County; Nolichucky River, Mitchell and Yancey Counties; South Toe and Cane Rivers, Yancey County
Thalictrum cooleyi (Cooley's meadowrue) - E	Columbus, Brunswick, Onslow Pender Counties

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

U.S. EPA
Old ATC Refinery
Commercial Fisheries on
the Cape Fear River

BVWS Project 52013.310
BVWS File SA
May 5, 1995
10:00 am

To: Fitz Rode
Company: North Carolina Department of Fish and Game
Division of Marine Fisheries
Phone No.: (910) 733-3633

Recorded by: Kem Reliford

Fitz Rode stated that there are seven commercial fisheries located in the Cape Fear River between Eagle Island and the Atlantic Ocean. He suggested calling Sheryl Phillips to obtain fish catch data.

BLACK & VEATCH Waste Science, Inc.

TELEPHONE MEMORANDUM

U.S. EPA
Old ATC Refinery
Recreational Fishing
and Boating on Cape Fear River

BVWS Project 52013.310
BVWS File SA
May 5, 1995
10:30 am

To: Fred Harris
Company: North Carolina Department of Fish and Game
Division of Boating and Inland Fisheries
Phone No.: (919) 733-3633

Recorded by: Kem Reliford

Fred Harris stated that there are an abundance of recreational fishers on the Cape Fear River. Statistical data concerning catch rates are unavailable. The Cape Fear River is also used extensively for recreational boating.

State of North Carolina
Department of Environment,
Health, and Natural Resources
Division of Marine Fisheries

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
Michael G.Buhl, Interim Director

Reference 41

Fax:

DEHNR

May 22, 1997

Black@Veatch
Attn: Paul Moisan
400 Northridge Rd..
Suite 350
Atlanta Ga. 30350

Dear Mr. Moisan:

Please find enclosed the data you requested. This data lists species landed from the Cape Fear River from February 1996 through February 1997 along with number of pounds and value. Please note the way the list is printed out. Yr. 96 are landings from February through December of 1996 and Yr. 97 are landings from January and February of 1997. Also, data are considered confidential when less than 3 dealers submitted landings. If you have any questions or need additional information, please call me at (919) 726-7021, ext. 621.

Sincerely,

Patricia L Murphey

Patricia L. Murphey
Marine Biologist
North Carolina Trip Ticket Program

Enclosure

P.O. Box 769, Morehead City, North Carolina 28557-0769
An Equal Opportunity Affirmative Action Employer

Telephone 919-726-7021 FAX 919-726-0254
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Commercial Landings Statistics

* Next to Weight - Denotes Confidential Data

YEAR	WATER	FISH	CONFI	LBS	VALUE
96	CAPE FEAR R.(06)	AMBERJACKS	*	.	.
		BLUEFISH		436	$92
		BUTTERFISH	*	.	.
		CARP	*	.	.
		CATFISHES		3,218	$1,054
		COBIA	*	.	.
		CROAKER, ATLANTIC		1,758	$533
		CUTLASSFISH, ATLANTIC	*	.	.
		DRUM,BLACK		1,770	$408
		DRUM,RED		4,594	$4,575
		FLOUNDERS, FLUKE		34,629	$65,007
		HAKES	*	.	.
		HICKORY SHAD	*	.	.
		JACKS	*	.	.
		KINGFISHES (SEA MULLET)		962	$864
		MACKEREL, SPANISH	*	.	.
		MENHADEN, ATLANTIC	*	.	.
		MULLETS		14,018	$8,942
		PERCH, WHITE	*	.	.
		PIGFISH	*	.	.
		POMPANO	*	.	.
		SEATROUT, SPOTTED		1,110	$1,242
		SHAD		26,496	$23,384
		SHEEPSHEAD		1,525	$481
		SKIPPERS	*	.	.
		SPADEFISH, ATLANTIC	*	.	.
		SPOT		8,969	$3,385
		STRIPED BASS		4,060	$4,939
		SWELLFISHES (PUFFERS)	*	.	.
		WEAKFISH (SEATROUT, GREY)		111	$57
		UNCLASSIFIED FISH		2,047	$1,915
		UNCL. FOR INDUSTRIAL / BAIT	*	.	.
		OTHER/F(INCLUDES CONFI.)		2,489	$635
		UNCLASSIFIED SHRIMP		80,380	$189,538
		CLAM, HARD (MEATS)		38,952	$237,910
		CONCHS (MEATS)	*	.	.
		CRABS, BLUE, HARD		537,862	$303,829
		CRABS, BLUE, SOFT & P		15,526	$25,749
		OYSTER (MEATS)		2,444	$9,191
		SQUID		58	$25
		UNCLASSIFIED SHELLFISH		1,302	$3,110
		OTHER/S(INCLUDES CONFI.)	*	.	.
96	CAPE FEAR R.(06)			784,714	$886,864
96				784,714	$886,864

NOTE: If OTHER/F or OTHER/S is confidential and values= '.'
then TOTALS do not include confidential data.

1994: Improved collection methods. Comparisons with other years may
be invalid. Value derived from average annual price.

Commercial Landings Statistics

* Next to Weight - Denotes Confidential Data

YEAR	WATER	FISH	CONFI	LBS	VALUE
97	CAPE FEAR R.(06)	CATFISHES		320	$101
		CROAKER, ATLANTIC	*	.	.
		DRUM,BLACK	*	.	.
		DRUM,RED		99	$99
		FLOUNDERS, FLUKE	*	.	.
		GIZZARD SHAD	*	.	.
		HAKES	*	.	.
		KINGFISHES (SEA MULLET)	*	.	.
		MULLETS		278	$129
		SEATROUT, SPOTTED		140	$158
		SHAD		5,474	$4,914
		STRIPED BASS		1,343	$1,633
		UNCLASSIFIED FISH	*	.	.
		OTHER/F(INCLUDES CONFI.)		457	$247
		CLAM, HARD (MEATS)		4,582	$25,457
		CRABS, BLUE, HARD		5,640	$3,166
		CRABS, BLUE, SOFT & P	*	.	.
		OYSTER (MEATS)		209	$786
		OTHER/S(INCLUDES CONFI.)	*	.	.
97	CAPE FEAR R.(06)			18,541	$36,690
97				18,541	$36,690
				803,256	$923,554

NOTE: If OTHER/F or OTHER/S is confidential and values= '.'
then TOTALS do not include confidential data.

1994: Improved collection methods. Comparisons with other years may
be invalid. Value derived from average annual price.

BLACK & VEATCH SPECIAL PROJECTS CORP.

MEMORANDUM

USEPA Region IV
Southern Wood Piedmont
Documentation of Greenfield Creek as a Fishery

BVSPC Project 52014.755

To: Project File

From: Robert L. Mangum, Jr.

During the course of biological sampling (hook and line) in Greenfield Creek, numerous floats, fishing line, and bait (night crawler) containers were observed along the creek bank. These items appeared from immediately south of SP-MW-29A westward to near SP-SD-19. Some type of homemade trap was observed tied to a tree on the south bank of the creek near SP-SD-08. The trap consisted of a 5-gallon plastic bucket and approximately 20 feet of net material.

FROST ASSOCIATES

88 Founders Village Rd, Clinton, CT 06413
(860) 669-5859 FAX (203) 767-1971

May 22, 1997

To: Black & Veatch Special Projects Corp.
400 Northridge Rd. Suite 350
Atlanta, GA 30350

Reference 43

Attn: Paul Moisan

Fr: Frost Associates
P.O. Box 495
Essex, Conn 06426

Tel: (203) 767-1254
Fax: (203) 767-7069

Sub: Southern Wood Piedmont
Willmington, NC

Job: 52014.755

Site Longitude: 77-57-07 77.951942
Site Latitude : 34-12-59 34.216389

The CENTRACTS report below identifies the population, households, and private water wells of each Block Group that lies within, or partially within, the 4, 3, 2, 1, .5, and .25, mile "rings" of the latitude and longitude coordinates above. CENTRACTS may have up to ten radii of any length. 1000 block groups, and 15000 block group sides.

CENTRACTS uses the 1990 Block Group population and Block Group house count data found in the Census Bureau's 1990 STF-1A files. The sources of water supply data are from the Bureau's 1990 STF-3A files. The boundary line coordinates of the Block Groups were extracted from the Census Bureau's 1990 TIGER/Line Files.

CENTRACTS reports are created with programs written by Frost Associates, P.O. Box 495, Essex, Conn. The code was written using Microsoft's Quick-Basic Ver. 4.5.

Latitude and Longitude coordinates identifying a site are entered in degrees and decimal degrees. One or more county files holding Block Group boundary lines are selected for use by CENTRACTS by determining whether the site coordinates fall within the minimum and maximum Lat\Lon coordinates of each county in the state.

Each Block Group line segment has Lat\Lon coordinates representing the "From" and "To" ends of that line. All coordinates from the selected county files are read and converted from degrees, decimal degrees to X\Y miles from the site location. Each line segment is then examined whether it lies within or partially within the maximum ring from the site.

The unique Block Group ID numbers of each line segment that lie within the maximum ring are retained. All Block Group boundary lines matching the Block Group numbers are then extracted from the respective county files to obtain all sides of the included Block Groups. Boundary records are then sorted in adjacent side order to determine the shape and area of each Block Group polygon.

A method to solve for the area of a polygon is to take one-half the sum of the products obtained by multiplying each X-coordinate by the difference between the adjacent Y-coordinates. For a polygon with coordinates at adjacent angles A, B, C, D, and E. The formula can be expressed:

Area = 1/2{Xa(Ye-Yb)+ Xb(Ya-Yb)+ Xc(Yb-Yd)+ Xd(Yc-Ye)+ Xe(Yd-Ya)}

For each ring, the selected Block Groups will be inside, outside, or intersected by the ring. When a polygon is intersected, the partial Block Group area within that ring is calculated using the method described below.

When a ring intersects a Block Group, the intersect points are solved and plotted at the points where the ring enters and exits the shape. The chord line, a line within the circle connecting the intersect points is determined. This chord line is used to calculate the segment area, the half moon shape between the chord line and the ring, and the sub-polygon created by the chord line and the Block Group boundaries that lie outside the ring.

The segment area is subtracted from the sub-polygon area to determine the area of the sub-polygon outside the ring. The area outside the ring is then subtracted from the area of the entire polygon to arrive at the inside area. This inside area is then divided by the tract's total area to determine the percentage of area within the ring. This process is repeated for each block group that is intersected by one of the rings. The total area, partial area, and percentage of partial area of those block groups within, or partially within a ring, are held in memory for the report.

On occasion, the algorithm described above is unable to determine the area of the partial area. Within the report program is a "Paint" routine which allows an enclosed shape to be highlighted. Another routine calculates the percentage of highlighted screen pixels to the pixels within the polygon. A manual entry is allowed. Both the "paint" method and manual entry method over ride the calculated method.

CENTRACTS lists, starting on page 4, all Block Groups in State, County, Census Tract, and Block Group ID order that lie within, or partially within, the maximum ring. Each Block Group is identified by a City or Town name and by the Block Group's State, County, Tract and Block Group ID number. Following is the Block Group's 1990 populu tion and house count extracted from the Census Bureau's 1990 STF-1A files.

The next four columns display water source data from the 1990 STF-3A files. The first column is "Units with Public system or private company source of water", followed by "Units with individual well, Drilled, source of water"; "Units with individual well, Dug, source of water" and "Units with Other source of water".

For each ring, CENTRACTS then shows the Block Groups that are within that ring, the Block Group's total area in square miles, the partial area of the Block Group within that ring, and the partial percentage within the ring. The areas of the included Block Group and the partial areas are then totaled.

The last section tallies the demographic data within each ring. The percentage of area for each Block Group is multiplied times the census data for that Block Group and totaled for all Block Group's within the ring. Ring totals are then determined by subtracting the three mile data from the four mile, the two mile from the three mile, one from the two, etc... Population on private wells is calculated using the formula: ((Drilled + Dug Wells) / Households) * Population

Southern Wood Piedmont
Willminfton, NC

No.	City	Block Group ID	Blk Grp People	House Holds	Public Water	Drilled Wells	Dug Wells	Other
1	Smithville	37019 0202 1	802	287	179	35	90	0
2	Smithville	37019 0202 2	1167	488	55	46	406	0
3	Town Creek	37019 0201981	1291	487	21	82	400	0
4	Town Creek	37019 0201982	945	382	160	46	187	0
5	Town Creek	37019 0201983	132	44	44	0	1	0
6	Town Creek	37019 0201984	1762	667	448	30	196	0
7	Town Creek	37019 0201985	1801	750	407	15	313	0
8	Town Creek	37019 0201986	678	254	63	29	141	0
9	NOT IDENTIFIED	37129 0101 1	473	209	227	0	0	0
10	NOT IDENTIFIED	37129 0101 2	809	311	350	0	0	0
11	NOT IDENTIFIED	37129 0101 3	233	82	86	0	0	0
12	NOT IDENTIFIED	37129 0101 4	559	342	318	0	0	0
13	NOT IDENTIFIED	37129 0101 5	316	168	188	0	0	0
14	Wilmington	37129 0102 1	806	340	315	0	0	0
15	Wilmington	37129 0102 2	1269	514	492	0	0	0
16	Wilmington	37129 0102 3	585	222	245	0	0	0
17	Wilmington	37129 0102 4	572	273	262	0	0	0
18	Wilmington	37129 0102 5	592	264	242	0	0	0
19	Wilmington	37129 0103 1	862	332	337	0	8	0
20	Wilmington	37129 0103 2	1799	504	500	0	0	0
21	Wilmington	37129 0103 3	835	400	392	0	10	0
22	Wilmington	37129 0103 4	822	394	383	0	0	0
23	Wilmington	37129 0103 5	305	124	126	0	0	0
24	Wilmington	37129 0104 1	1667	707	718	0	0	0
25	Wilmington	37129 0104 2	1079	621	610	0	0	0
26	Wilmington	37129 0106 1	1277	616	591	0	0	0
27	Wilmington	37129 0106 2	1978	968	993	0	0	0
28	Wilmington	37129 0107 1	3000	1629	1681	7	5	0
29	Masonboro	37129 0108 1	1353	730	736	0	0	0
30	Masonboro	37129 0108 3	1177	539	455	0	25	0
31	Masonboro	37129 0108 9	103	51	35	0	5	0
32	Cape Fear	37129 0109 1	168	111	118	0	0	0
33	Cape Fear	37129 0109 2	836	406	421	0	0	0
34	Cape Fear	37129 0109 3	1302	613	596	0	0	0
35	Cape Fear	37129 0109 9	0	0	0	0	0	0
36	Wilmington	37129 0110 1	6	151	152	0	0	0
37	Wilmington	37129 0110 2	1875	960	949	0	0	0
38	Wilmington	37129 0110 3	241	104	109	0	0	0
39	Wilmington	37129 0111 1	908	446	449	0	0	0
40	Wilmington	37129 0111 2	1219	454	422	0	0	0
41	Wilmington	37129 0111 3	728	359	378	0	0	0
42	Wilmington	37129 0111 4	347	185	195	0	0	0
43	Wilmington	37129 0112 1	486	274	282	0	0	0
44	Wilmington	37129 0112 2	198	100	101	0	0	0
45	Wilmington	37129 0112 3	854	444	425	0	0	0
46	Wilmington	37129 0112 4	755	360	368	0	0	0
47	Wilmington	37129 0113 1	119	99	91	0	0	0
48	Wilmington	37129 0113 2	480	308	320	0	0	0
49	Wilmington	37129 0113 3	389	287	277	0	0	0
50	Wilmington	37129 0113 4	667	336	346	0	0	0
51	Wilmington	37129 0114 1	102	44	36	0	0	0
52	Wilmington	37129 0114 2	22	5	5	0	0	0
53	Wilmington	37129 0114 3	538	228	218	0	0	0
54	Wilmington	37129 0114 4	344	168	168	0	0	0
55	Wilmington	37129 0114 5	657	328	329	0	0	0

Southern Wood Piedmont
Willminfton, NC

56	Cape Fear	37129	0115 3	472	205	0	5	176	0
57	Cape Fear	37129	0115 4	1093	454	6	39	413	7
58	Cape Fear	37129	0115 5	1649	611	258	33	321	0
59	Wilmington	37129	0105012	397	207	223	0	0	0
60	Wilmington	37129	0105014	945	699	710	0	0	0
61	Wilmington	37129	0105023	1524	738	691	0	0	0
62	Wilmington	37129	0105025	1364	774	775	0	0	0
63	Wilmington	37129	0105027	741	446	433	0	0	0
64	Wilmington	37129	0105028	416	219	242	0	0	0
65	Wilmington	37129	0105029	338	169	148	0	0	11
66	Harnett	37129	0116017	2988	1152	872	7	302	0
67	Wilmington	37129	0116024	1026	322	98	40	192	9
68	Wilmington	37129	0119014	2506	275	22	10	245	0
69	Wilmington	37129	0119027	1139	722	705	5	0	0
70	Harnett	37129	0120014	1024	438	409	0	6	0
71	Masonboro	37129	0120026	3935	1445	1348	0	93	0
72	Wilmington	37129	0120035	1883	927	910	0	16	0
73	Wilmington	37129	0120039	2461	1028	901	4	111	0
74	Wilmington	37129	0121013	1132	470	475	7	20	0
75	Wilmington	37129	0121014	1836	650	538	13	96	0
76	Cape Fear	37129	0123983	0	0	0	0	0	0
	Totals:			73159	32420	28178	453	3778	27

Southern Wood Piedmont
Willminfton, NC

City	Census Tract ID	Tract People	House Count	Public Water	Drilled Wells	Dug Wells	Other Sources
Cape Fear	37129 0115 5	1649	611	258	33	321	0
Cape Fear	37129 0123983	0	0	0	0	0	0
Cape Fear	37129 0109 9	0	0	0	0	0	0
Cape Fear	37129 0109 1	168	111	118	0	0	0
Cape Fear	37129 0109 2	836	406	421	0	0	0
Cape Fear	37129 0109 3	1302	613	596	0	0	0
Cape Fear	37129 0115 3	472	205	0	5	176	0
Cape Fear	37129 0115 4	1093	454	6	39	413	7
	Sub Totals:	5520	2400	1399	77	910	7
Harnett	37129 0120014	1024	438	409	0	6	0
Harnett	37129 0116017	2988	1152	872	7	302	0
	Sub Totals:	4012	1590	1281	7	308	0
Masonboro	37129 0108 9	103	51	35	0	5	0
Masonboro	37129 0108 3	1177	539	455	0	25	0
Masonboro	37129 0120026	3935	1445	1348	0	93	0
Masonboro	37129 0108 1	1353	730	736	0	0	0
	Sub Totals:	6568	2765	2574	0	123	0
NOT IDENTIFIED	37129 0101 3	233	82	86	0	0	0
NOT IDENTIFIED	37129 0101 2	809	311	350	0	0	0
NOT IDENTIFIED	37129 0101 4	559	342	318	0	0	0
NOT IDENTIFIED	37129 0101 5	316	168	188	0	0	0
NOT IDENTIFIED	37129 0101 1	473	209	227	0	0	0
	Sub Totals:	2390	1112	1169	0	0	0
Smithville	37019 0202 2	1167	488	55	46	406	0
Smithville	37019 0202 1	802	287	179	35	90	0
	Sub Totals:	1969	775	234	81	496	0
Town Creek	37019 0201981	1291	487	21	82	400	0
Town Creek	37019 0201983	132	44	44	0	1	0
Town Creek	37019 0201986	678	254	63	29	141	0
Town Creek	37019 0201984	1762	667	448	30	196	0
Town Creek	37019 0201982	945	382	160	46	187	0
Town Creek	37019 0201985	1801	750	407	15	313	0
	Sub Totals:	6609	2584	1143	202	1238	0
Wilmington	37129 0106 2	1978	968	993	0	0	0
Wilmington	37129 0102 4	572	273	262	0	0	0
Wilmington	37129 0106 1	1277	616	591	0	0	0
Wilmington	37129 0103 4	822	394	383	0	0	0
Wilmington	37129 0103 5	305	124	126	0	0	0
Wilmington	37129 0104 2	1079	621	610	0	0	0
Wilmington	37129 0103 3	835	400	392	0	10	0
Wilmington	37129 0102 3	585	222	245	0	0	0
Wilmington	37129 0110 1	6	151	152	0	0	0
Wilmington	37129 0110 2	1875	960	949	0	0	0
Wilmington	37129 0102 2	1269	514	492	0	0	0

Wilmington	37129	0111 1	908	446	449	0	0	0
Wilmington	37129	0111 2	1219	454	422	0	0	0
Wilmington	37129	0111 3	728	359	378	0	0	0
Wilmington	37129	0104 1	1667	707	718	0	0	0
Wilmington	37129	0112 1	486	274	282	0	0	0
Wilmington	37129	0112 2	198	100	101	0	0	0
Wilmington	37129	0112 3	854	444	425	0	0	0
Wilmington	37129	0112 4	755	360	368	0	0	0
Wilmington	37129	0113 1	119	99	91	0	0	0
Wilmington	37129	0113 2	480	308	320	0	0	0
Wilmington	37129	0113 3	389	287	277	0	0	0
Wilmington	37129	0113 4	667	336	346	0	0	0
Wilmington	37129	0111 4	347	185	195	0	0	0
Wilmington	37129	0102 1	806	340	315	0	0	0
Wilmington	37129	0114 3	538	228	218	0	0	0
Wilmington	37129	0114 4	344	168	168	0	0	0
Wilmington	37129	0114 5	657	328	329	0	0	0
Wilmington	37129	0102 5	592	264	242	0	0	0
Wilmington	37129	0103 1	862	332	337	0	8	0
Wilmington	37129	0103 2	1799	504	500	0	0	0
Wilmington	37129	0105012	397	207	223	0	0	0
Wilmington	37129	0105014	945	699	710	0	0	0
Wilmington	37129	0105023	1524	738	691	0	0	0
Wilmington	37129	0105025	1364	774	775	0	0	0
Wilmington	37129	0105027	741	446	433	0	0	0
Wilmington	37129	0105028	416	219	242	0	0	0
Wilmington	37129	0105029	338	169	148	0	0	11
Wilmington	37129	0107 1	3000	1629	1681	7	5	0
Wilmington	37129	0116024	1026	322	98	40	192	9
Wilmington	37129	0119014	2506	275	22	10	245	0
Wilmington	37129	0119027	1139	722	705	5	0	0
Wilmington	37129	0114 1	102	44	36	0	0	0
Wilmington	37129	0114 2	22	5	5	0	0	0
Wilmington	37129	0120035	1883	927	910	0	16	0
Wilmington	37129	0120039	2461	1028	901	4	111	0
Wilmington	37129	0121013	1132	470	475	7	20	0
Wilmington	37129	0121014	1836	650	538	13	96	0
Wilmington	37129	0110 3	241	104	109	0	0	0
	Sub Totals:		46091	21194	20378	86	703	20

Southern Wood Piedmont
Willminfton, NC

For Radius of 4 Mi., Circle Area = 50.265482

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Smithville	37019 2021	7.858315	7.675529	97.67
2	Smithville	37019 2022	43.423283	6.823134	15.71
3	Town Creek	37019 201981	33.867371	0.031680	0.09
4	Town Creek	37019 201982	4.579318	0.041639	0.91
5	Town Creek	37019 201983	3.121224	2.793929	89.51
6	Town Creek	37019 201984	3.031576	0.388915	12.83
7	Town Creek	37019 201985	1.960853	1.673836	85.36
8	Town Creek	37019 201986	4.834888	0.534556	11.06
9	NOT IDENTIFIED	37129 1011	0.243031	0.243031	100.00
10	NOT IDENTIFIED	37129 1012	0.116902	0.116902	100.00
11	NOT IDENTIFIED	37129 1013	0.101699	0.101699	100.00
12	NOT IDENTIFIED	37129 1014	0.103275	0.103275	100.00
13	NOT IDENTIFIED	37129 1015	0.074969	0.074969	100.00
14	Wilmington	37129 1021	0.237103	0.237103	100.00
15	Wilmington	37129 1022	0.149204	0.149204	100.00
16	Wilmington	37129 1023	0.209690	0.209690	100.00
17	Wilmington	37129 1024	0.104135	0.104135	100.00
18	Wilmington	37129 1025	0.121192	0.121192	100.00
19	Wilmington	37129 1031	0.906012	0.570189	62.93
20	Wilmington	37129 1032	1.071455	1.071455	100.00
21	Wilmington	37129 1033	0.279809	0.279809	100.00
22	Wilmington	37129 1034	0.281171	0.281171	100.00
23	Wilmington	37129 1035	0.125451	0.125451	100.00
24	Wilmington	37129 1041	0.684319	0.684319	100.00
25	Wilmington	37129 1042	0.240179	0.240179	100.00
26	Wilmington	37129 1061	1.246757	1.246757	100.00
27	Wilmington	37129 1062	1.633048	1.633048	100.00
28	Wilmington	37129 1071	1.500876	1.500876	100.00
29	Masonboro	37129 1081	0.294872	0.294872	100.00
30	Masonboro	37129 1083	0.385096	0.385096	100.00
31	Masonboro	37129 1089	1.421195	1.421195	100.00
32	Cape Fear	37129 1091	0.129120	0.129120	100.00
33	Cape Fear	37129 1092	0.063311	0.063311	100.00
34	Cape Fear	37129 1093	0.340524	0.340524	100.00
35	Cape Fear	37129 1099	0.506106	0.506106	100.00
36	Wilmington	37129 1101	0.178461	0.178461	100.00
37	Wilmington	37129 1102	0.256212	0.256212	100.00
38	Wilmington	37129 1103	0.100038	0.100038	100.00
39	Wilmington	37129 1111	0.192921	0.192921	100.00
40	Wilmington	37129 1112	0.104863	0.104863	100.00
41	Wilmington	37129 1113	0.127028	0.127028	100.00
42	Wilmington	37129 1114	0.091349	0.091349	100.00
43	Wilmington	37129 1121	0.096423	0.096423	100.00
44	Wilmington	37129 1122	0.132593	0.132593	100.00
45	Wilmington	37129 1123	0.130420	0.130420	100.00
46	Wilmington	37129 1124	0.094327	0.094327	100.00
47	Wilmington	37129 1131	0.224445	0.224445	100.00
48	Wilmington	37129 1132	0.160253	0.160253	100.00
49	Wilmington	37129 1133	0.089605	0.089605	100.00
50	Cape Fear	37129 123983	0.134752	0.134752	100.00
51	Wilmington	37129 1141	0.144637	0.144637	100.00
52	Wilmington	37129 1142	0.260504	0.260504	100.00
53	Wilmington	37129 1143	0.099050	0.099050	100.00

54	Wilmington	37129 1144	0.073113	0.073113	100.00
55	Wilmington	37129 1145	0.451023	0.451023	100.00
56	Cape Fear	37129 1153	0.881122	0.346206	39.29
57	Cape Fear	37129 1154	2.915532	0.832135	28.54
58	Cape Fear	37129 1155	20.175747	4.234949	20.99
59	Wilmington	37129 105012	0.215606	0.098603	45.73
60	Wilmington	37129 105014	0.349281	0.246786	70.66
61	Wilmington	37129 105023	1.033041	1.033041	100.00
62	Wilmington	37129 105025	0.330555	0.330555	100.00
63	Wilmington	37129 105027	0.439989	0.439989	100.00
64	Wilmington	37129 105028	0.125770	0.125770	100.00
65	Wilmington	37129 105029	0.191141	0.191141	100.00
66	Harnett	37129 116017	1.863114	0.011088	0.60
67	Wilmington	37129 116024	4.538497	0.737173	16.24
68	Wilmington	37129 119014	1.471153	0.002784	0.19
69	Wilmington	37129 119027	0.481903	0.212250	44.04
70	Harnett	37129 120014	0.969124	0.302374	31.20
71	Masonboro	37129 120026	2.384378	0.054318	2.28
72	Wilmington	37129 120035	0.938303	0.894005	95.28
73	Wilmington	37129 120039	4.120430	2.168332	52.62
74	Wilmington	37129 121013	2.843947	2.319680	81.57
75	Wilmington	37129 121014	5.103919	0.002636	0.05
76	Wilmington	37129 1134	0.430328	0.430328	100.00
	Totals:		170.192215	50.354046	

For Radius of 3 Mi., Circle Area = 28.274334

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Smithville	37019 2021	7.858315	6.449635	82.07
2	Smithville	37019 2022	43.423283	2.479320	5.71
5	Town Creek	37019 201983	3.121224	1.802789	57.76
7	Town Creek	37019 201985	1.960853	0.472706	24.11
9	NOT IDENTIFIED	37129 1011	0.243031	0.243031	100.00
10	NOT IDENTIFIED	37129 1012	0.116902	0.116902	100.00
11	NOT IDENTIFIED	37129 1013	0.101699	0.101699	100.00
12	NOT IDENTIFIED	37129 1014	0.103275	0.103275	100.00
13	NOT IDENTIFIED	37129 1015	0.074969	0.074969	100.00
14	Wilmington	37129 1021	0.237103	0.237103	100.00
15	Wilmington	37129 1022	0.149204	0.149204	100.00
16	Wilmington	37129 1023	0.209690	0.209690	100.00
17	Wilmington	37129 1024	0.104135	0.104135	100.00
18	Wilmington	37129 1025	0.121192	0.121192	100.00
20	Wilmington	37129 1032	1.071455	0.243799	22.75
21	Wilmington	37129 1033	0.279809	0.279809	100.00
22	Wilmington	37129 1034	0.281171	0.257062	91.43
23	Wilmington	37129 1035	0.125451	0.026236	20.91
24	Wilmington	37129 1041	0.684319	0.684319	100.00
25	Wilmington	37129 1042	0.240179	0.240179	100.00
26	Wilmington	37129 1061	1.246757	0.574987	46.12
27	Wilmington	37129 1062	1.633048	1.633048	100.00
28	Wilmington	37129 1071	1.500876	1.500876	100.00
29	Masonboro	37129 1081	0.294872	0.294872	100.00
30	Masonboro	37129 1083	0.385096	0.385096	100.00
31	Masonboro	37129 1089	1.421195	1.421195	100.00
32	Cape Fear	37129 1091	0.129120	0.129120	100.00
33	Cape Fear	37129 1092	0.063311	0.063311	100.00

34	Cape Fear	37129 1093	0.340524	0.340524	100.00
35	Cape Fear	37129 1099	0.506106	0.506106	100.00
36	Wilmington	37129 1101	0.178461	0.178461	100.00
37	Wilmington	37129 1102	0.256212	0.256212	100.00
38	Wilmington	37129 1103	0.100038	0.100038	100.00
39	Wilmington	37129 1111	0.192921	0.192921	100.00
40	Wilmington	37129 1112	0.104863	0.104863	100.00
41	Wilmington	37129 1113	0.127028	0.127028	100.00
42	Wilmington	37129 1114	0.091349	0.091349	100.00
43	Wilmington	37129 1121	0.096423	0.096423	100.00
44	Wilmington	37129 1122	0.132593	0.132593	100.00
45	Wilmington	37129 1123	0.130420	0.130420	100.00
46	Wilmington	37129 1124	0.094327	0.094327	100.00
47	Wilmington	37129 1131	0.224445	0.224445	100.00
48	Wilmington	37129 1132	0.160253	0.160253	100.00
49	Wilmington	37129 1133	0.089605	0.089605	100.00
50	Cape Fear	37129 123983	0.134752	0.134752	100.00
51	Wilmington	37129 1141	0.144637	0.141426	97.78
52	Wilmington	37129 1142	0.260504	0.260410	99.96
53	Wilmington	37129 1143	0.099050	0.099050	100.00
54	Wilmington	37129 1144	0.073113	0.073113	100.00
55	Wilmington	37129 1145	0.451023	0.360342	79.89
56	Cape Fear	37129 1153	0.881122	0.015011	1.70
57	Cape Fear	37129 1154	2.915532	0.002371	0.08
58	Cape Fear	37129 1155	20.175747	1.974740	9.79
61	Wilmington	37129 105023	1.033041	0.206026	19.94
62	Wilmington	37129 105025	0.330555	0.027746	8.39
63	Wilmington	37129 105027	0.439989	0.279296	63.48
72	Wilmington	37129 120035	0.938303	0.005385	0.57
73	Wilmington	37129 120039	4.120430	0.740320	17.97
74	Wilmington	37129 121013	2.843947	0.298831	10.51
76	Wilmington	37129 1134	0.430328	0.430328	100.00
	Totals:		105.279160	28.274265	

For Radius of 2 Mi., Circle Area = 12.566371

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Smithville	37019 2021	7.858315	4.375852	55.68
2	Smithville	37019 2022	43.423283	0.092994	0.21
5	Town Creek	37019 201983	3.121224	0.708940	22.71
9	NOT IDENTIFIED	37129 1011	0.243031	0.029894	12.30
10	NOT IDENTIFIED	37129 1012	0.116902	0.114156	97.65
11	NOT IDENTIFIED	37129 1013	0.101699	0.101699	100.00
12	NOT IDENTIFIED	37129 1014	0.103275	0.103275	100.00
13	NOT IDENTIFIED	37129 1015	0.074969	0.068608	91.51
14	Wilmington	37129 1021	0.237103	0.026535	11.19
15	Wilmington	37129 1022	0.149204	0.064288	43.09
16	Wilmington	37129 1023	0.209690	0.188326	89.81
17	Wilmington	37129 1024	0.104135	0.104135	100.00
18	Wilmington	37129 1025	0.121192	0.102871	84.88
24	Wilmington	37129 1041	0.684319	0.039231	5.73
27	Wilmington	37129 1062	1.633048	0.642132	39.32
28	Wilmington	37129 1071	1.500876	1.111260	74.04
29	Masonboro	37129 1081	0.294872	0.294872	100.00
30	Masonboro	37129 1083	0.385096	0.114387	29.70
31	Masonboro	37129 1089	1.421195	0.332646	23.41

32	Cape Fear	37129 1091	0.129120	0.129120	100.00
33	Cape Fear	37129 1092	0.063311	0.063311	100.00
34	Cape Fear	37129 1093	0.340524	0.340524	100.00
35	Cape Fear	37129 1099	0.506106	0.506106	100.00
36	Wilmington	37129 1101	0.178461	0.178461	100.00
37	Wilmington	37129 1102	0.256212	0.256212	100.00
38	Wilmington	37129 1103	0.100038	0.100038	100.00
39	Wilmington	37129 1111	0.192921	0.192921	100.00
40	Wilmington	37129 1112	0.104863	0.104863	100.00
41	Wilmington	37129 1113	0.127028	0.127028	100.00
42	Wilmington	37129 1114	0.091349	0.091349	100.00
43	Wilmington	37129 1121	0.096423	0.096423	100.00
44	Wilmington	37129 1122	0.132593	0.132593	100.00
45	Wilmington	37129 1123	0.130420	0.130420	100.00
46	Wilmington	37129 1124	0.094327	0.094327	100.00
47	Wilmington	37129 1131	0.224445	0.176849	78.79
48	Wilmington	37129 1132	0.160253	0.160253	100.00
49	Wilmington	37129 1133	0.089605	0.089605	100.00
50	Cape Fear	37129 123983	0.134752	0.134752	100.00
53	Wilmington	37129 1143	0.099050	0.044422	44.85
58	Cape Fear	37129 1155	20.175747	0.559491	2.77
76	Wilmington	37129 1134	0.430328	0.430328	100.00
	Totals:		85.641312	12.755494	

For Radius of 1 Mi., Circle Area = 3.141593

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Smithville	37019 2021	7.858315	0.901510	11.47
5	Town Creek	37019 201983	3.121224	0.050824	1.63
28	Wilmington	37129 1071	1.500876	0.158949	10.59
32	Cape Fear	37129 1091	0.129120	0.129120	100.00
33	Cape Fear	37129 1092	0.063311	0.063311	100.00
34	Cape Fear	37129 1093	0.340524	0.038155	11.20
35	Cape Fear	37129 1099	0.506106	0.336736	66.53
37	Wilmington	37129 1102	0.256212	0.184496	72.01
38	Wilmington	37129 1103	0.100038	0.060051	60.03
39	Wilmington	37129 1111	0.192921	0.001248	0.65
40	Wilmington	37129 1112	0.104863	0.048589	46.34
41	Wilmington	37129 1113	0.127028	0.125656	98.92
42	Wilmington	37129 1114	0.091349	0.091349	100.00
45	Wilmington	37129 1123	0.130420	0.047805	36.66
48	Wilmington	37129 1132	0.160253	0.052622	32.84
49	Wilmington	37129 1133	0.089605	0.089605	100.00
58	Cape Fear	37129 1155	20.175747	0.287539	1.43
76	Wilmington	37129 1134	0.430328	0.430328	100.00
	Totals:		35.378242	3.097896	

For Radius of .5 Mi., Circle Area = 0.785398

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Smithville	37019 2021	7.858315	0.100364	1.28

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28	Wilmington	37129 1071	1.500876	0.000000	0.00
32	Cape Fear	37129 1091	0.129120	0.015452	11.97
33	Cape Fear	37129 1092	0.063311	0.004207	6.64
35	Cape Fear	37129 1099	0.506106	0.046728	9.23
37	Wilmington	37129 1102	0.256212	0.017148	6.69
38	Wilmington	37129 1103	0.100038	0.005603	5.60
42	Wilmington	37129 1114	0.091349	0.003589	3.93
49	Wilmington	37129 1133	0.089605	0.000281	0.31
58	Cape Fear	37129 1155	20.175747	0.399718	1.98
76	Wilmington	37129 1134	0.430328	0.192309	44.69
	Totals:		31.201008	0.785398	

For Radius of .25 Mi., Circle Area = 0.196350

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
76	Wilmington	37129 1134	0.430328	0.196350	45.63
	Totals:		0.430328	0.196350	

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========== Site Data ==========

Population:	49514.76
Households:	23769.21
Drilled Wells:	105.37
Dug Wells:	894.49
Other Water Sources:	14.46

========== Partial (RING) data ==========

---- Within Ring: 4 Mile(s) and 3 Mile(s) ----

Population:	14322.21
Households:	6643.25
Drilled Wells:	58.60
Dug Wells:	619.52
Other Water Sources:	14.45

** Population On Private Wells: 1461.97

---- Within Ring: 3 Mile(s) and 2 Mile(s) ----

Population:	13886.18
Households:	6467.45
Drilled Wells:	21.08
Dug Wells:	202.56
Other Water Sources:	0.01

** Population On Private Wells: 480.18

---- Within Ring: 2 Mile(s) and 1 Mile(s) ----

Population:	15061.77
Households:	7463.98
Drilled Wells:	20.46
Dug Wells:	56.97
Other Water Sources:	0.00

** Population On Private Wells: 156.24

---- Within Ring: 1 Mile(s) and .5 Mile(s) ----

Population:	5674.12
Households:	2910.11
Drilled Wells:	4.13
Dug Wells:	7.94
Other Water Sources:	0.00

** Population On Private Wells: 23.52

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---- Within Ring: .5 Mile(s) and .25 Mile(s) ----

Population:	266.14
Households:	131.12
Drilled Wells:	1.10
Dug Wells:	7.51
Other Water Sources:	0.00

** Population On Private Wells: 17.48

---- Within Ring: .25 Mile(s) and 0 Mile(s) ----

Population:	304.34
Households:	153.31
Drilled Wells:	0.00
Dug Wells:	0.00
Other Water Sources:	0.00

** Population On Private Wells: 0.00

** Total Population On Private Wells: 2139.38