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North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

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Ronald H. Levine, M.D., M.P.H.
State Health Director

31 October 1986

Ms. Denise Smith
EPA NC CERCLA Project Officer
Air and Hazardous Material Division
345 Courtland Street, N.E.
Atlanta, GA 30365

CERCLA

Dear Ms. Smith:

SUBJECT: Site Investigation Report
USS Agri Chemicals Farm Service, NC D000818616
Highway 701, Route 3, Box 212
Whiteville, NC 28472

Submitted herewith is the Site Investigation Report and Mitre Ranking System (HRS) prepared by the NC CERCLA Group for the subject site.

USS Agri Chemicals Farm Service is an agricultural warehouse that was originally built in 1962. From 1962 until 1979 it was called Farmers Oil and Fertilizer and oil, kerosene, fertilizer, pesticides, and agricultural chemicals were sold at this site. From November 1979 until August 1985, USS Agri Chemical leased the property from Mr. L.E. Watts and sold only agricultural chemicals such as fertilizer and pesticides. Since August 1985 the warehouse has been called Watts Farm Center and agricultural chemicals continue to be sold. Prior to 1962 the property was open farm land.

In 1980 a bulk mixer was purchased which contained solid residue material. Approximately 35 cubic feet of this material was reportedly removed from the mixer and buried on the site. On January 25, 1982 Mr. Robert B. Flagg reported that this material was fertilizer residue containing 2,4-Dichlorophenoxyacetic Acid (2,4-D), a listed hazardous substance.

On July 16, 1986, Jack Butler, Stan Atwood, and Grover Nicholson, NC DHR/DHS CERCLA Unit, performed a site investigation at this site. After meeting with Mr. L.E. Watts and discussing the burial of this 2,4-D containing material and our objectives, Mr. Watts accompanied us to the general area of the burial. Approximately 12 exploratory holes were augered to depths of about 4 or 5 feet in the burial area. Although no residue material was found, clay from a depth of 48 inches in one location was sampled. This clay was noted to have slight agrichemical type odor. A background soil sample was collected from a depth of 8 inches on the east end of the property. Water from an on site drinking water well was also sampled. Mr. Watts reported that this well was under a paved area in front of the building, was about 50 feet deep, and had been there since the early 1960s.

If you have any questions please contact me at (919) 733-2801.

Sincerely,

Jack Butler

Jack Butler, Environmental Engineer
CERCLA Unit
Solid and Hazardous Waste Management Branch
Environmental Health Section

JB/tb/0321b

SITE INSPECTION REPORT

USS Agri Chemicals Farm Service
NC D000818616
Highway 701, Route 3, Box 212
Whiteville, NC 28472

31 October 1986

Jack R. Butler, Environmental Engineer
NC Division of Health Services
Environmental Health Section
Solid and Hazardous Waste Management Branch
CERCLA Unit

EXECUTIVE SUMMARY

USS Agri Chemicals Farm Service, NC D000828616, in Whiteville, NC is an agricultural warehouse that was originally built in 1962. From 1962 until 1979 it was called Farmers Oil and Fertilizer and oil, kerosene, fertilizer, pesticides, and agricultural chemicals were sold at this site. From November 1979 until August 1985, USS Agri Chemical leased the property from Mr. L.E. Watts and sold only agricultural chemicals such as fertilizer and pesticides. Since August 1985 the warehouse has been called Watts Farm Center and agricultural chemicals continue to be sold. Prior to 1962 the property was open farm land.

In 1980 a bulk mixer was purchased which contained solid residue material. Approximately 35 cubic feet of this material was reportedly removed from the mixer and buried on site. On January 25, 1982 a USS Agri Chemicals representative reported that this material was fertilizer residue containing 2,4-Dichlorophenoxyacetic Acid (2,4-D), a listed hazardous substance.

The building on the site is served by an approximately 50 ft. deep well. This well is under a paved parking lot and is reportedly 388 ft. from the burial site.

BACKGROUND

Location

The USS Agri Chemicals Farm Service site is on Hwy. 701 approximately 6 miles south-southwest of Whiteville, NC and approximately 6.5 miles southeast of Chadbourn, NC. Watts Farm Center currently operates on this site. The address is Route 3, Box 212, Whiteville, NC 28472 (1). The coordinates of the site are: Latitude: 34° 14' 52"; Longitude: 78° 45' 18" (Map 1, Appendix A).

Site Layout

The property on which this site is located is reportedly 172 ft. x 503 ft. The waste burial site is on the western end of the property reportedly 75 ft. east of the west boundary and 125 ft. south of the north boundary (2, Map 2, Appendix A). An unnamed intermittent creek flows along the western boundary of the property and enters Big Pond Branch approximately 0.7 miles downstream from the site. The terrain of both the site and surrounding area is very flat with a slope near 0 (Map 1, Appendix A).

Ownership History

The USS Agri Chemicals Farm Service facility was originally built in 1962. From 1962 until 1979 it was called Farmers Oil and Fertilizer and oil, kerosene, fertilizer, pesticides, and agricultural chemicals were sold at this site. From November 1979 until August 1985, USS Agri Chemicals leased the property from Mr. L.E. Watts and sold only agricultural chemicals such as fertilizer and pesticides. Since August 1985 the warehouse has been called Watts Farm Center and agricultural chemicals continue to be sold. Prior to 1962 the property was open farm land (1,3).

Site Use History

Prior to 1962 this property was used for farming. In 1962 Farmers Oil and Fertilizer began selling agricultural chemicals and supplies, oil, and kerosene, on this site. Although management of the operation has changed twice during its history, this site has been used to sell farm supplies since 1962 (1,3).

In 1980 a bulk mixer was purchased which contained solid residue material Approximately 35 cubic feet of this material was reportedly removed from the mixer and buried on the western end of the site. On January 25, 1982 a USS Agri Chemicals representative reported that this material was fertilizer residue containing 2,4-Dichlorophenoxyacetic Acid (2,4-D), a listed hazardous substance (1,2,4,5).

Permit and Regulatory History

No environmental permits have been issued and no regulatory action has been taken at this site. This is not a RCRA facility (6,7).

Remedial Actions to Date

On July 28, 1980 a groundwater sample was collected from the drinking water well on the site. This water was tested by gas chromatography for the following chloro-phenoxy herbicides: MCPP, Dicambia, 2,4-D, 2,4-DB, Silvex, and 2,4,5-T. No response corresponding to these compounds was detected (2,4). No further remedial action has been taken at this site.

Summary Trip Report

On 16 July 1986, Jack Butler, Stan Atwood, and Grover Nicholson, NC DHR/DHS CERCLA Unit, performed a site investigation at the USS Agri Chemical Farm Service site. After meeting with Mr. L.E. Watts and discussing the burial of the material containing 2,4-D and the objectives of the site investigation, Mr. Watts accompanied the CERCLA team to the general area of the burial. Approximately 12 exploratory holes were augered to depths of about 4 or 5 feet in the burial area. Although no residue material was found, clay from a depth of 48 inches in one location was sampled. This clay was noted to have slight agrichemical type odor. A background soil sample was collected from a depth of 8 inches on the east end of the property. Water from the on-site drinking water well was also sampled. Mr. Watts reported that this well was under a paved area in front of the building, was about 50 ft. deep, and had been there since the early 1960s. A sketch of this site showing sampling locations is shown in Map 2, Appendix A.

ENVIRONMENTAL SETTING

Topography

The USS Agri Chemicals Farm Service site is located in central Columbus County, NC approximately six miles south of the towns of Chadbourn and Whiteville. This area of North Carolina is in the Atlantic Coast Flatwood region. The topography consists of a nearby level coastal plain cut by broad valleys with meandering streams. Local relief is mainly a few feet to ten or twenty feet (8). The USS Agri Chemicals Farm Service site elevation is approximately 70 to 75 ft. above sea level (Map 1, Appendix A).

Surface Waters

The western edge of the USS Agri Chemicals Farm Service site property is bound by an unnamed intermittent creek. The waste burial site is reportedly 75 ft. east of this creek (2). This creek crosses U.S. 701 and enters Big Pond Branch approximately 0.7 miles downstream from the site. Big Pond Branch flows approximately 0.3 miles before entering Beaver Dam Swamp. Beaver Dam Swamp becomes Monie Swamp at Boggy Branch approximately 5 miles southeast of the site. Monie Swamp drains to Grissett Swamp which drains to the Waccamaw River near Pireway, NC approximately 19 miles southeast of the site. Big Pond Branch, Beaver Dam Swamp, Monie Swamp, Grissett Swamp, Seven Creeks, and the Waccamaw River are all Class C SW waters in this area. The Waccamaw River becomes a Class B SW water at the N.C. 904 bridge just downstream of the entrance of Seven Creek (Joe Lake) (9). No users of these surface waters were identified within 5 miles of the USS Agri Chemicals Farm Service site.

Geology and Soils

The geologic column consist of basement rocks of gneiss, schist, granite, and metavolcanics lying 600 to 700 feet beneath the surface. Lying unconformably over these basement rocks are the arkosic sands and massive clays of the Late Cretaceous Tuscaloosa Formation. The Black Creek Formation, also of Late Cretaceous age, lies unconformably on the Tuscaloosa Formation, and consists of interbedded sands and clays. The Late Cretaceous Peedee Formation, comprised of layers of sandy silt, sand, and sandy marl, overlie the Black Creek. Finally, surficial deposits of sands, clays, and marls of the Tertiary Duplin and Yorktown Formations top the column (10).

Groundwater

Well logs in Columbus County indicate two usable aquifers, the Peedee and the Black Creek. Both aquifers are confined above and below by clay beds. The unconfined surface aquifer is generally not used because it is unprotected from surface contamination. The lowermost aquifer, the Tuscaloosa, contains brackish groundwater (10).

Climate and Meteorology (11,12)

Seasonal Temperatures:	(°F)	January	July
	Mean Max.	58°F	88 - 90°F
	Mean Min.	36 - 40°F	68 - 72°F
	Mean	48°F	80°F

Precipitation:	(inches)	
	Mean annual precipitation:	48 - 52 inches
	Mean annual evaporation:	42 inches
	Net annual precipitation:	6 - 10 inches
	Mean annual snowfall:	2 inches
	One year 24-hour rainfall:	3 - 3.5 inches

Storm Events:		
	Mean days/year with thunderstorms:	40 - 60
	Prevailing winds and wind speeds:	SW at 9 mph

Emissions Inventory Summary for Columbus County (Tons/year) (13)

Type	Area Sources	Point Sources
Particulates	5,840	1,406
Sulfur Dioxide	351	7,735
Nitrogen Oxides	3,216	2,082
Volatile Organics & Hydrocarbons	4,170	412
Carbon Monoxide	20,162	12,427

Land Use

This property has been used to operate a farm supply business since 1962. Prior to 1962 the property was farm land (1). Agriculture is the primary use of land within 5 miles of the site. Rural houses and communities usually at crossroads, are prevalent. The nearest urban areas of any size are Chadbourn about 6.5 miles to the northwest and Whiteville about 6.0 miles to the northeast (Maps 1 and 3, Appendix A).

Population Distribution

The population density for Columbus County is reportedly 54 people per square mile (13). Multiplying this factor by the number of square miles within 1, 2, and 3 miles of the site yields populations of 170; 679; and 1527 people within 1, 2, and 3 miles respectively.

Water Supply

The Town of Chadbourn draws water from 4 wells located approximately 6 miles northwest of the USS Agri Chemicals Farm Service site (14,15, Map 3, Appendix A). These wells serve approximately 2,000 residents in the town limits and approximately 125 households along a 3.1 mile long corridor following NC Hwy. 130 east of Chadbourn (16).

The Town of Whiteville also uses 4 groundwater wells which serve approximately 8,000 residents (17). The Town of Whiteville is approximately 6 miles northeast of the USS Agri Chemicals Farm Service site (Map 2, Appendix A).

The Town of Brunswick is served by 2 wells approximately 4 miles northeast of the site. Approximately 100 residents utilize water from these wells (18).

Duchess Forest Water Service operates 2 wells approximately 4 miles northeast of the subject site. These wells serve 34 families or approximately 130 residents (3.8 residents per family) (19).

Columbus County Correction Facility is approximately 3 miles northeast of the site and is served by groundwater. Nineteen additional non-community water systems utilizing groundwater were also identified within a 5 mile grid of the subject site. Of these 15 are churches and 4 are businesses including the USS Agri Chemicals Farm Services Center (20). It is assumed that the remainder of the residents in the are utilize private wells for drinking water.

Critical Environments

Beaverdam Swamp is a wetland area that comes within 1 mile of the USS Agri Chemicals Farm Service site (Map 1 and 3, Appendix A). The nearest federally designated critical habitat is in Burke County, NC approximately 220 miles from the subject site (21). Approximately 100 miles from the site 2 additional critical habitats have been proposed on the Deep River and Rocky River (22).

WASTE TYPES AND QUANTITIES

Waste Quantities

Approximately 35 cubic feet (or approx. 2.5 tons) of solid residue from a used bulk mixer was buried on the site in 1980. This residue was reportedly fertilizer containing 2,4-Dichlorophenoxyacetic acid (2,4-D) (1,2,3,4,5). Dicambia (2-Methoxy-3, 6-dichlorobenzoic acid) and MCPP (2-(4-Chloro-2-methylphenoxy)propanoic acid) may have also been present in this solid residue (2).

Waste Disposal Methods and Locations

The waste material discussed in the previous section was buried in an unlined pit on the site. The pit was reportedly 75 ft. from a small unnamed intermittent branch and 125 ft. from the rural road on the north edge of the property (2).

Waste Types

The waste material was reportedly fertilizer residue containing 2,4-D (1,2,3,4,5). Dicambia and MCPP may have also been present in the residue (2).

LABORATORY DATA

Summary

Water from the well on the site was analyzed for arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver and organic constituents. No inorganics were found above the detection limit. Clay from a depth of 48 inches in the area of the burial, and a background soil sample from a depth of 8 inches on the east end of the property were also collected and analyzed for organic contaminants. No organics were found above the detection limit. Sampling locations are shown in Map 2, Appendix A.

Quality Assurance

All sampling equipment used was unused disposable equipment or thoroughly cleaned before use to minimize the possibility of contamination. All sample containers were also thoroughly cleaned by DHR/DHS laboratory personnel prior to use.

TOXICOLOGICAL/CHEMICAL CHARACTERISTICS

The material buried at this site was a fertilizer residue reportedly containing 2,4-D (1,2,3,4,5). Dicambia and MCPP may have also been present (2). The chemical name for 2,4-D is 2,4-Dichlorophenoxyacetic acid. Dicambia is also commonly called Banvel and its chemical name is 2-Methoxy-3, 6-dichlorobenzoic acid. MCPP is also commonly known as Mecoprop and its chemical name is 2-(4-Chloro-2-methylphenoxy) propanoic acid or 4-Chloro-2-methylphenoxy-alpha-propionic acid. Toxicological and chemical characteristics for these 3 substances is presented on the following pages (23,24).

2,4-D

CHEMICAL NAME: 2,4-Dichlorophenoxyacetic acid.

COMMON NAME: *2,4-D.*

OTHER NAMES: *Agrotect* * (Miller Chemical & Fertilizer), *Amidox* * (discontinued by Union Carbide Australia), *Amoxone, Aqua-Kleen* *, *BH* * *2,4-D, Brush-Rhap* * (discontinued by Vertac), *Chipco Turf Herbicide "D"* *, *Chloroxone* *, *Crop Rider* *, *2,4-D* *, *D50* * (Shell Chemicals U.K.), *Dacamine* *, *Débroussaillant 600* *, *Ded-Weed* *, *Desormone* * (Union Carbide), *Dicotox* * (discontinued by Union Carbide Australia), *Dinoxol* * (Union Carbide), *DMA* * *4, Dormone* *, *Emulsamine* * *BK* (Union Carbide), *Emulsamine* * *E-3* (Union Carbide), *Envert* * *DT* (Union Carbide), *Envert* * *171* (Union Carbide), *Esteron* * *99 Concentrate, Esteron* * *Four, Esteron* * *Brush Killer, Estone* *, (*Fernesta* *, *Fernimine* *, *Fernoxone* * are ICI Plant Protection Div. trade names), *Ferxone* * (Atul), *Formula 40* *, *Hedonal* *, *Herbidal* *, *Lawn-Keep* *, *Macondray* *, *Miracle* *, *Nétagrone* * *600, Pennamine* * *D* (Pennwalt), *Planotox* * (May & Baker), *Plantgard* *, *Rhodia* *, *Salvo* * (Crystal Chemical), *Spritz-Hormin/2,4-D, Spritz-Hormit/2,4-D, Superormone Concentre* *, *Super D Weedone* * (Union Carbide), *Transamine* *, *Tributon* *, *U 46* *, *U 46 D-Ester* *, *U 46 D-Fluid* *, *Vergemaster* * (discontinued by Diamond Shamrock Agrochemicals Ltd.), *Verton* * *2D* (discontinued by Dow Chemical), Visko-Rhap *, *Weed-B-Gon* * (Chevron), *Weedar* *, *Weedatul, Weedone* * (Union Carbide), *Weed-Rhap* *, *Weed Tox, Weedtrol* *.

FORMER TRADE NAMES: *Weed-Ag-Bar* * and *Weedez Wonder Bar* *.

ACTION: Selective herbicide.

CHEMICAL PROPERTIES: White powder melting at 140.5° C. Only slightly soluble in water and petroleum distillate; soluble in alcohols. The acid is not used customarily by itself, usually as an amine, a salt or an ester.

TOXICITY: Acute LD_{50} (rat), 370 mg (acid)/kg; 500-1200 mg(esters)/kg; 300-1200 mg (amines)/kg; 666-875 mg (sodium salt)/ kg. At usual application rates *2,4-D* has no adverse effect on soil microorganisms.

SIGNAL WORD: CAUTION.

ANTIDOTE: Treat symptomatically. Remove poison by inducing vomiting.

FIRST AID TREATMENT: Skin — Flush with plenty of water, remove contaminated clothing and clean before reuse. Get medical attention if any irritation develops. Eyes — Flush with plenty of water. Get medical attention.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food or feed by storage or disposal of this product. Do not store near other agrochemicals or seeds. Do not use spray equipment contaminated with this product for any other purposes unless thoroughly cleaned with a suitable cleaner.

CAUTION: The greatest danger to susceptible crops when *2,4-D* is used, is spray drift and volatilization. Highly volatile esters may result in vapor damage to such crops while low volatile esters such as propylene glycol butyl ether ester are less likely to cause damage and salt formations are essentially non-volatile. Do not apply where irrigation water may be contaminated with *2,4-D.*

APPLICATIONS: Registered for use on grasses, wheat, barley, oats, sorghum, corn, sugarcane and noncrop areas for postemergent control of weeds such as Canada thistle, dandelion, annual mustards, ragweed, and lambsquarters. Certain formulations are registered for pine release, waterhyacinth control and prevention of seed formation. Many broadleaf crops are extremely sensitive, such as cotton and grape vines.

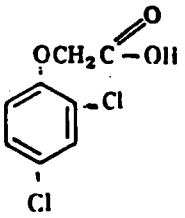
FORMULATIONS: Sodium salts of *2,4-D* are applied as soluble powders; amine salts are soluble in water; esters are soluble in oils, hence are generally in form of an emulsion when applied. Formulations usually bear declared content in pounds acid equivalent (a.i.) per gallon.

The amine in largest production is the dimethylamine salt, others being the diethanolamine, trimethylamine, etc. Trade name products include *Amoxone* * (triethanolamine), *Dacamine* * (oleyl propylenediamine), *DMA* * *4* (dimethylamine), *Ded-Weed* *, *Emulsamine* * *E-3* (a mixture of dodecylamine and tetradodecylamine), *Fernimine* *, *Formula 40* * (ethanol and isopropyl series), *Hedonal* *, *Pennamine* * *D* (heptylamine), *Weedar* *, *Weed- Rhap* *.

As with amines which form salts with the *2,4-D* acid, the esters are made with a wide variety of alcohols. Examples are: *Rhodia 2,4-D Low Volatile Ester 4L* * and *SULV* (contain *2,4-D* isooctylester), *Rhodia 2,4-D Butyl Ester 6E* and *Esteron* * *76BE* (butyl ester), *Esteron* * *99 Concentrate* (propylene glycol butyl ether ester), *Estone* * (ethyl ester), *Hedonal* * (isooctyl ester), *Weedone* * *LV4* (butoxy ethanol ester), *Planotox* * (butoxyethyl ester), *Weed Rhap* * *2,4-D*-ethyl hexyl ester.

COMBINATIONS: *Mad* * is a mixture of *MSMA* with *2,4-D* as a liquid suspension. *2,4-D* and *2,4,5-T* are combined in a variety of esters, under such names as *Esteron* * *Brush Killer, Brush-Rhap LV 2D-2T* *, *Ded-Weed* * *SULV Amine* (TH Agriculture & Nutrition Co.), *Rhodia Low Volatile Brush Killer No.2*, and *Visko- Rhap Low Volatile Ester 1D-1T* *. Also *2,4-D* and *2,4,5-T* mixed with *Banvel* *; *2,4-D* with *benazolin; Chipco Turf Kleen* * *(2,4-D + MCPP).*

See *Lithate* * *2,4-D* for lithium salt.



2,4-D

BP: Akzo Zout Chemie Nederland BV (The Netherlands)
All India Medical Corp. (India) (*Weed Tox*)
Agchem Manufacturing Corp. (Philippines) (*Miracle* *, *Weedtrol* *)
"Atanor" Sociedad Anomina Mixta (Argentina)
The Atul Products Ltd. (India) (*Weedatul*)
BASF Aktiengesellschaft (Federal Republic of Germany) (*U 46* *, *U 46 D-Ester* *, *U 46 D-Fluid* *)
Bayer AG (Federal Republic of Germany) (*Hedonal* *)
Compañia Quimica S.A. (Argentina)
Crewe Chemicals Ltd. (Great Britain)
Diamond Shamrock
Diamond Shamrock Agrochemicals Ltd. (Great Britain) (*BH* * *2,4-D, Dormone* *)
The Dow Chemical Co. (*DMA* * *4, Esteron* *, *Formula 40* *)
A.H. Marks & Co., Ltd. (Great Britain)
Nissan Chemical Industries, Ltd. (Japan) (*2,4-D* *)
Rhone-Poulenc Chemical Co., Agrochemical Div. (*Chipco Turf Herbicide "D"* *, *Chipco Turf Kleen* *, *Rhodia* *, *Visko-Rhap* *)
Rhone-Poulenc (France) (*Débroussaillant 600* *, *Desormone* *, *Herbidal* *, *Nétagrone 600* *, *Superormone* *)
TH Agriculture & Nutrition Co., Inc. (*Ded-Weed* *)
Ugimica, S.A. (Spain)
VEB Chemiekombinat Bitterfeld (GDR) (*Spritz-Hormin/2,4-D, Spritz Hormit/2,4-D*)
Vertac Chemical Corp. (*Transamine* *, *Weed-Rhap* *)

F: Devidayal (Sales) Private Ltd. (India)

DICHLOROPHENOXYACETIC ACID

CAS RN: 94757 NIOSH #: AG 6825000
mf: $C_8H_6Cl_2O_3$; mw: 221.04

White powder. mp: 141°; bp: 160° @ 0.4 mm; vap d: 7.63.

SYNS:

ACIDE 2,4-DICHLORO PHENOXY-ACETIQUE (FRENCH)
ACIDO (2,4-DICLORO-FENOSSI)-ACETICO (ITALIAN)
2,4-D ACID
(2,4-DICHLOOR-FENOXY)-AZIJNZUUR (DUTCH)
2,4-DICHLORPHENOXYACETIC ACID
(2,4-DICHLOR-PHENOXY)-ESSIGSAEURE (GERMAN)

TOXICITY DATA: 3	CODEN:
dnr-esc 5 mg/disc	NTIS** PB80-133226
dnr-bcs 5 mg/disc	NTIS** PB80-133226
orl-rat TDLo:400 mg/kg (7-14D preg)	GISAAA 41(11),102,76
scu-mus TDLo:884 mg/kg/(12-15D preg) TFX:TER	AECTCV 6,33,77
orl-mus TDLo:900 mg/kg (6-14D preg)	NTIS** PB223-160
scu-mus TDLo:882 mg/kg (6-14D preg)	NTIS** PB223-160
scu-mus TDLo:900 mg/kg (6-14D preg)	NTIS** PB223-160
orl-ham TDLo:200 mg/kg (7-11D preg)	BECTA6 6,599,67
orl-hmn LDLo:80 mg/kg	ARPAAQ 94,270,72
sln-dmg-orl 1000 ppm/15D	MUREAV 65,83,79
mrc-smc 300 mg/L/3H	MUREAV 42,3,77
mma-hmn:fbr 1 umol/L	MUREAV 42,161,77
dns-hmn:fbr 1 umol/L	MUREAV 42,161,77
cyt-hmn:lym 20 ug/L	TGANAK 8(3),202,74
dns-mus-orl 200 mg/kg	MUREAV 55,197,78
cyt-mus-orl 100 mg/kg	TGANAK 8(3),202,74
dnd-mam:lym 1 mmol/L	PYTCAS 11,3135,72
orl-rat TDLo:1 gm/kg (6-15D preg)	TXAPA9 22,14,72
orl-mus TDLo:707 mg/kg (11-14D preg)	AECTCV 6,33,77
ihl-man TCLo:10 mg/m3:CNS	GISAAA 31,28,66
orl-hmn LD50:80 mg/kg	ARPAAQ 94,270,72
ihl-man TCLo:10 mg/m3:GIT	GISAAA 31,28,66
orl-rat LD50:370 mg/kg	FMCHA2 -,D88,80
skn-rat LD50:1500 mg/kg	WRPCA2 9,119,70
ipr-rat LDLo:666 mg/kg	JIHTAB 29,85,47
orl-mus LD50:368 mg/kg	AJVRAH 15,622,54
ipr-mus LDLo:125 mg/kg	TXAPA9 23,288,72
orl-dog LD50:100 mg/kg	AEHLAU 7,202,63
orl-rbt LDLo:800 mg/kg	AMPMAR 12,26,51
skn-rbt LD50:1400 mg/kg	AFDOAQ 16,3,52
ipr-rbt LDLo:400 mg/kg	JIHTAB 29,85,47
ivn-rbt LDLo:400 mg/kg	JIHTAB 29,85,47
orl-gpg LD50:469 mg/kg	AJVRAH 15,622,54
ipr-gpg LDLo:666 mg/kg	JIHTAB 29,85,47
orl-ham LD50:500 mg/kg	TXAPA9 48,A192,79
orl-ckn LD50:541 mg/kg	AJVRAH 15,622,54
orl-mam LD50:375 mg/kg	SCIEAS 165,465,69

Aquatic Toxicity Rating: TLm96:10-1 ppm WQCHM* 2,-,74. Carcinogenic Determination: Animal Suspected IARC** 15,111,77.

TLV: Air: 10 mg/m3 DTLVS* 4,117,80. *Toxicology Review:* RREVAH 59,1,75; DTTIAF 80(20),485,73; RREVAH 56,107,75; ECMAAI 14(3),141,73; BIOGAL 40(2),44,74. OSHA Standard: Air: TWA 10 mg/m3 (SCP-T) FEREAC 39,23540,74. DOT-ORM-A, Label: None FEREAC 41,57018,76. "NIOSH Manual of Analytical Methods" VOL 5 S279#. Reported in EPA TSCA Inventory, 1980.

THR: MUT data. An exper TER and susp CARC. A hmn CNS, GIT. HIGH orl, ivn, ipr, scu. MOD orl ipr, skn. Ingest can cause nausea, vomiting and CNS depression. Liver and kidney injury have been reported in expers. An herbicide.

Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

Banvel *

CHEMICAL NAME: 2-Methoxy-3, 6-dichlorobenzoic acid, or 3, 6-Dichloro-*o*-anisic acid.

COMMON NAMES: *dianat* (USSR), *dicamba*.

OTHER NAMES: *Banex* *, *Banvel II* *, *Banvel D* *, *Brush Buster* *, *mediben*.

ACTION: Herbicide.

CHEMICAL PROPERTIES: Melting point 114-116° C.

TOXICITY: Acute oral LD_{50} (rat), 1707-2900 mg/kg (technical); 2629 mg/kg (*DMA* salt); 6764 mg/kg (sodium salt). Acute dermal LD_{50} (rabbit), > 2000 mg/kg (technical and *DMA* salt); >20,000 mg/kg (sodium salt).

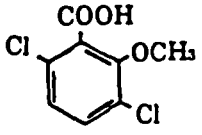
SIGNAL WORD: CAUTION.

ANTIDOTE: Not specific; if swallowed, drink water and induce emesis.

APPLICATIONS: For control of both annual and perennial broadleaf weeds in field and silage corn, grain sorghum, small grains (not underseeded to legumes), asparagus, grass seed crops, turf, pasture, rangeland and noncropland areas such as fence rows, roadways and wasteland. Also for control of brush and vines in noncropland, pasture, and rangeland areas. Approved tolerance for grass is 40 ppm and for milk .05 ppm. *Banvel* * has been approved for spot treatment of perennial broadleaf weeds in cropland to be rotated to wheat. *Banvel* * has also been approved for between cropping systems uses.

FORMULATION: Dimethylamine salt in water containing 4 pounds/gallon acid equivalent; oil soluble, 4 pounds/gallon; granular 5% and 10%. *Banvel II* * is the sodium salt containing 2 pounds/gallon acid equivalent.

COMBINATIONS: Formulations are available containing *Banvel* * in combination with *2,4-D* and *2,4,5-T* amine and low volatile ester; also with *benazolin* and *MCPA*. Labeling provides for tank mixes with *atrazine, bromoxynil, Lasso* *, *MCPA* and *2,4,5-T*. For premix combinations, see *Banvel K* *, *MonDak* *, *Weedmaster* *.



Dicamba

BP: Velsicol Chemical Corp. (*Brush Buster* *)

2-METHOXY-3,6-DICHLOROBENZOIC ACID

CAS RN: 1918009 NIOSH #: DG 7525000
mf: $C_8H_6Cl_2O_3$; mw: 221.04

SYNS:

ACIDO (3,6-DICLORO-2-METOSSI)-BENZOICO (ITALIAN)
COMPOUND B DICAMBA
DIANAT (RUSSIAN)
3,6-DICHLOOR-2-METHOXY-BENZOEIZUUR (DUTCH)
3,6-DICHLOR-3-METHOXY-BENZOESAEURE (GERMAN)
3,6-DICHLORO-O-ANISIC ACID
2,5-DICHLORO-6-METHOXYBENZOIC ACID
3,6-DICHLORO-2-METHOXYBENZOIC ACID

TOXICITY DATA: 2	CODEN:
dnr-esc 5 mg/disc	NTIS** PB80-133226
dnr-bcs 5 mg/disc	NTIS** PB80-133226
orl-rat LD50:1040 mg/kg	RREVAH 10,97,65
orl-mus LD50:1190 mg/kg	HYSAAV 35,14,70
orl-rbt LD50:2000 mg/kg	HYSAAV 35,14,70
orl-gpg LD50:3000 mg/kg	HYSAAV 35,14,70
unk-mam LD50:1000 mg/kg	30ZDA9 -,147,71

Toxicology Review: DTTIAF 80(20),485,73.
THR: MOD orl, unk.
Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

Mecoprop

CHEMICAL NAME: 2-(4-Chloro-2-methylphenoxy) propanoic acid.

COMMON NAMES: *MCPP, mecoprop* (BSI, CSA, ISO, WSSA), *CMPP.*

OTHER NAMES: *BH * Mecoprop, Chipco Turf Herbicide MCPP *, Compitox ** and *Compitox Plus* (May and Baker), *Hedonal * MCPP, Iso-Cornox *, Kilprop *, Mecomec ** (PBI/Gordon), *Mepro *, Methoxone *, Propal *, Proponex-Plus ** (Shell Chemicals U.K.), *U 46 *, U 46 KV-Ester *, U 46 KV-Fluid **.

ACTION: Systemic herbicide.

CHEMICAL PROPERTIES: Colorless crystals melting at 94-95° C. Solubility in water at 20° C is only 620 ppm. Readily soluble in most organic solvents.

TOXICITY: Acute oral LD_{50} (rat), 930 mg/kg; (mouse), 650 mg/kg.

SIGNAL WORD: CAUTION.

ANTIDOTE: None. Remove poison by inducing vomiting.

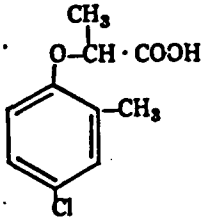
HANDLING AND STORAGE CAUTIONS: Solutions of the salt of *MCPP* are stable for several years under normal storage conditions. At low temperatures the salt will crystallize out of solution, but the crystals will redissolve on warming.

APPLICATIONS: Registered for use on sports and ornamental turf for selective control of surface-creeping broadleaf weeds such as red and white clovers, chickweed, knotweed, plantain, dandelion and ground ivy and in cereals, alone or in admixture with other plant growth regulators, e.g. *2,4-D*, for the control of chickweed, cleavers, etc.

FORMULATIONS: Diethanolamine salt *(Mecopar *, Chipco Turf Herbicide MCPP *)*, dimethylamine salt *(U 46 *)*; potassium salt *(Mecopex *, Hedonal * MCPP, U 46 *)*. Butyl and isooctyl esters.

COMBINATION: With *bentazon: Basagran-KV* (BASF); with *2,4-D* (Cleary).

See *Methoxone **.



Mecoprop

BP: Akzo Zout Chemie Nederland BV (The Netherlands)
BASF Aktiengesellschaft (Federal Republic of Germany) *(U 46 KV-Ester *, U 46 KV-Fluid *, Basagran-KV *)*
Bayer AG (Federal Republic of Germany) *(Hedonal * MCPP)*
W.A. Cleary Corp.
Crewe Chemicals Ltd. (Great Britain) *(MCPP)*
Diamond Shamrock
Diamond Shamrock Agrochemicals Ltd. (Great Britain) *(BH * Mecoprop *)*
FBC Limited (Great Britain) *(Iso-Cornox *)*
A.H. Marks & Co., Ltd. (Great Britain)
Rhone-Poulenc Chemical Co., Agrochemical Div. *(Chipco Turf Herbicide MCPP)*
Universal Crop Protection Ltd. (Great Britain) *(Propal *)*

4-CHLORO-2-METHYLPHENOXY-alpha-PROPIONIC ACID

CAS RN: 93652 NIOSH #: UE 9750000
mf: $C_{10}H_{11}ClO_3$; mw: 214.66

SYNS:

ACIDE 2-(4-CHLORO-2-METHYL-PHENOXY)PROPIONIQUE (FRENCH)
ACIDO 2-(4-CLORO-2-METIL-FEN-OSSI)-PROPIONICO (ITALIAN)
2-(4-CHLOOR-2-METHYL-FEN OXY)-PROPIONZUUR (DUTCH)
2-(4-CHLOR-2-METHYL-PHEN-OXY)-PROPIONSAEURE (GER-MAN)
(+)-ALPHA-(4-CHLORO-2-METHYLPHENOXY) PROPIONIC ACID
2-(4-CHLORO-2-METHYLPHEN-OXY)PROPIONIC ACID
2-(4-CHLOROPHENOXY-2-METHYL)PROPIONIC ACID
2-(P-CHLORO-O-TOLYLOXY)PRO-PIONIC ACID
ALPHA-(2-METHYL-4-CHLORO-PHENOXY)PROPIONIC ACID
2-(2-METHYL-4-CHLOROPHEN-OXY)PROPIONIC ACID
2-METHYL-4-CHLOROPHENOXY-ALPHA-PROPIONIC ACID

TOXICITY DATA: 2

mrc-smc 742 ppm
dns-mus-orl 100 mg/kg
orl-rat LD50:650 mg/kg
ipr-rat LD50:402 mg/kg
orl-mus LD50:650 mg/kg
unk-mus LD50:650 mg/kg
skn-rbt LD50:900 mg/kg

CODEN:

MUREAV 21,83,73
MUREAV 55,197,78
WRPCA2 9,119,70
TXCYAC 3,349,75
FMCHA2 -,D191,80
30ZDA9 -,172,71
PCOC** -,683,66

Toxicology Review: DTTIAF 80(20),485,73. Reported in EPA TSCA Inventory, 1980.
THR: MUT data. MOD orl, ipr, skn, unk.
Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

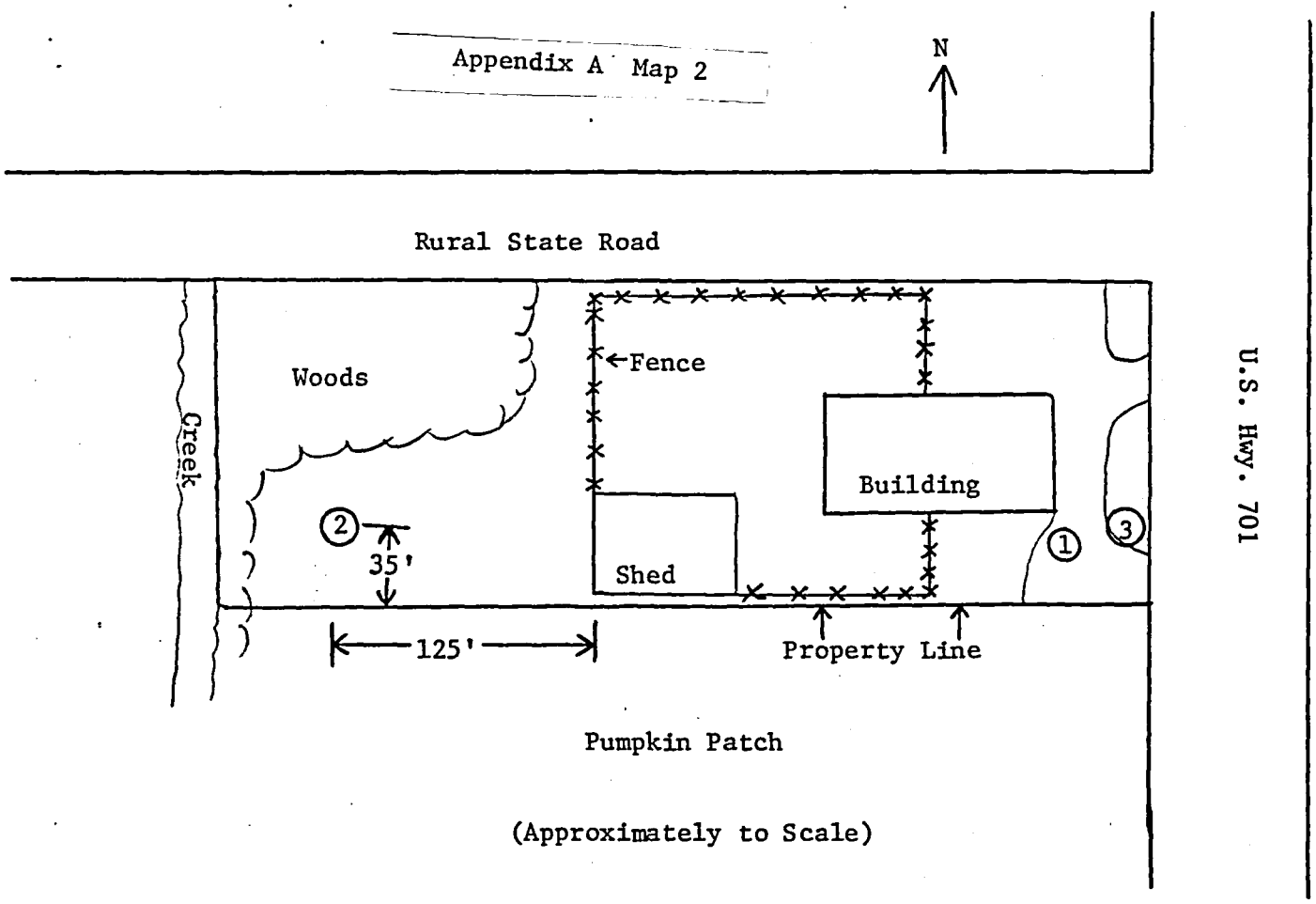
Appendix A

Maps

Appendix A Map 1

TABOR CITY EAST QUADRANGLE
NORTH CAROLINA–SOUTH CAROLINA
7.5 MINUTE SERIES (TOPOGRAPHIC)

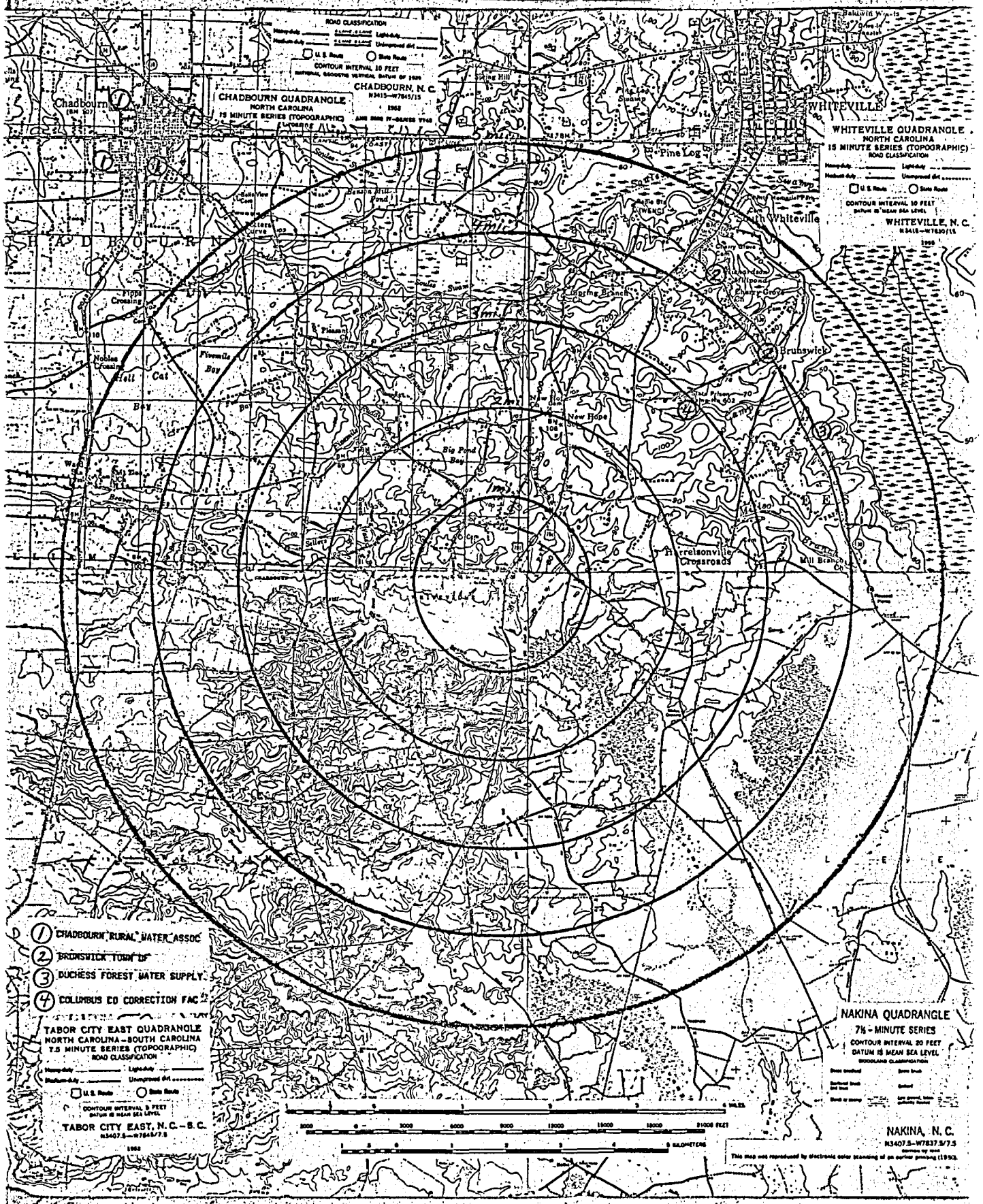
Appendix A Map 2



Sampling Points

1. 50 ft. deep drinking water well.
2. 48 inch deep soil sample (in general burial area).
3. 8 inch deep background soil sample.

Appendix A Map 3



Appendix B

Laboratory Data

cc: Morris

N. C. Department of Human Resources
Division of Health Services

SAMPLE ANALYSES REQUEST

received 7-31-86

State Laboratory of Public Health
P. O. Box 28047
306 N. Wilmington Street
Raleigh, 27611

Site Number NCD000828616 Field Sample Number 003714

Name of Site USS Agrichemicals Farm Serv. Site Location Whiteville, N.C.

Collected By S.R. Butler ID# 44 Date Collected July 16 1986 Time 1055

Type of Sample:

Environmental	Concentrate	Comments
✓ Groundwater (1)	___ Solid (5)	Well - Need drinking water std.
___ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

RECEIVED JUL 31 1986 SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		✓ Arsenic	<0.01	✓ Silver	<0.05
___ Barium		✓ Barium	<0.1	___ Sulfates	
___ Cadmium		✓ Cadmium	<0.005	___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		✓ Chromium	<0.01	___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		✓ Lead	<0.03		
		___ Manganese			
		✓ Mercury	<0.0002		
		___ Nitrate			
		✓ Selenium	<0.005		

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ P&T:GC/MS		___ EDB		___ Methoxychlor	
___ Acid:B/N Ext.		___ PCB's		___ Toxaphene	
___ TOX		___ Petroleum		___ 2,4-D	
		___ Endrin		___ 2,4,5-TP (silvex)	
		___ Lindane			

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received ___ Date Reported 7-25-86

Date Extracted ___ Date Analyzed ___

Reported By ___ Lab Number 15054 JUL 18 86

DHS 3191 (Revised 7/85)

N. C. DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH

Chain of Custody Record

Hazardous Waste Materials

Location of Sampling: ____Generator ____Transporter ____Treatment Facility
____Storage Facility ____Disposal Facility ____Landfill
✓ Other: Agrichem, Distributor

Company's Name MSS Agrichemical Telephone (919) 642-4006

Address Hwy 701, Rt. 3, Box 212, Whiteville, N.C. 28472

Collector's Name J R Butler Telephone (919) 733-2178
signature

Date Sampled July 16, 1986 Time Sampled 10:30 - 12:00 noon

Type of Process Generating Waste Agrichemical Distributor

Field Information

Field Sample No. 3385 3386 3387 3388

Chain of Possession:

1. J R Butler — Env. Eng. — July 16-17, 1986
signature — title — inclusive dates

2. Vicki S. Painter — Chemical Analyst — 7-17-86
signature — title — inclusive dates

3. _____ signature — _____ title — _____ inclusive dates

Results reported

_____ signature — _____ title — _____ date

Instructions: Complete all applicable information including signatures, and submit with analysis request forms.

N. C. DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH

Receipt for Samples

The samples described below were collected in connection with the administration, enforcement, and documentation of the:

( ) North Carolina Hazardous Waste Management Rules, 10 NCAC 10F

( ) North Carolina Solid Waste Management Rules, 10 NCAC 10G

(✓) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

( ) Toxic Substances Control Act (TSCA) 15 U.S.C. §2601, et seq., specifically Section 11 of TSCA, 15 U.S.C. § 2610.

Jack R. Butler — Inspector's Name
P.O. Box 2091, Raleigh, N.C. 27602 — Inspector's Address

Watts Farm Center
USS Agrichemical — Name of Firm
Hwy. 701, Rt. 3, Box 212, Whiteville, NC 28472 — Firm Address

L. E. Watts — Firm Owner, Operator, or Agent
Co-Owner — Title

SAMPLE NUMBER	COLLECTED		SAMPLE TYPE			DUPLICATE SAMPLES			SAMPLE LOCATION	
	DATE	TIME	WATER	SOIL	OTHER	OFFERED	ACCEPTED	REJECTED	ON-SITE	OFF-SITE

Receipt for the sample(s) described above is hereby acknowledged:

J R Butler
Signature of Inspector

Env. Eng.
Title

Receipt/rejection of duplicate or split samples is hereby acknowledged:

L. E. Watts
Signature of Firm Owner, Operator, or Agent

Co-Owner
Title

COMMENTS

* PESTICIDE + HERBICIDE EXTRACTION FIRST

CC: Worrell

N. C. Department of Human Resources
Division of Health Services

SAMPLE ANALYSES REQUEST

Received 10-16-86

State Laboratory of Public Health
P. O. Box 28047
306 N. Wilmington Street
Raleigh, 27611

Site Number 24D000828616 Field Sample Number 003385

Name of Site USS Agrichemicals Farm Serv. Site Location Whiteville, N.C.

Collected By J.R. Butler ID# 44 Date Collected July 16, 1986 Time 1055

Type of Sample:

Environmental	Concentrate	Comments
✓ Groundwater (1)	___ Solid (5)	Well - Need drinking water std.
___ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		___ Arsenic		___ Silver	
___ Barium		___ Barium		___ Sulfates	
___ Cadmium		___ Cadmium		___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		___ Chromium		___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		___ Lead			
		___ Manganese			
		___ Mercury			
		___ Nitrate			
		___ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ P&T:GC/MS		___ EDB		✓ Methoxychlor	<0.001
✓ Acid:B/N Ext.	QNS*	___ PCB's		✓ Toxaphene	<0.002
___ TOX		___ Petroleum		✓ 2,4-D	<0.001
		✓ Endrin	<0.0001	✓ 2,4,5-TP (silvex)	<0.001
		✓ Lindane	<0.0004		

*Quantity Not Sufficient for BN/A.

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received 7-17-86 V.P.

Date Reported 10-6-86

Date Extracted PEST. 8-27-86 V.P. Herb. 9-11-86 BJD

Date Analyzed PEST 8-29-86 V.P. Herb 9-12-86 ~~BJD 9-11-86~~

Reported By John L. Neal

Lab Number 602013

#602013-602016

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

Purpose: Enforcement and compliance with the N. C. Solid and Hazardous Waste Management Rules.

Preparation A sample analyses request form (DHS 3191) must be completed for each type of evaluation requested (e.g., inorganic, organic, microbiology, radiochemistry). For sampling conditions which require more than one (1) container (i.e., ground or surface water from landfills) a sample label must be affixed to one of the containers. The collector must then write the **site** and **sample** number on the duplicate.

Do not submit an analysis request sheet with no parameters indicated.

Equivalent measurements:

$$ppm = \mu g/ml = mg/l = \mu g/g = mg/kg$$
$$ppb = \mu g/l = \mu g/1000g = \mu g/kg$$

DEFINITIONS/INSTRUCTIONS

Site Number — A twelve-digit site/location identifier, assigned only by the district field representative.

Field Sample Number — A six-digit sample identifier which is pre-printed on the sample label.

Name of Site — Name of landfill, facility, etc.

Site Location — Address, street number, state road, etc.

Collected By — Name and ID of sample collector.

Date and Time Collected — Self-explanatory.

Environmental — A sample of a naturally occurring substance such as groundwater, surface water or soils which may be contaminated.

Concentrate — A sample of a waste, including but not limited to, sludges, resins, treatment effluents or drummed wastes.

Comments — Lists details regarding sample or sample point, including but limited to, phase separation, and/or odors.

Inorganic Chemistry — Check (✓) the desired parameters to be analyzed. Extractables are only performed on a solid or semi-solid. For routine landfill samples, check all parameters in the second and third columns.

Organic Chemistry — Check (✓) the desired parameter to be analyzed. If not listed, enter the name in the space provided.

Microbiology and Radiochemistry — The Raleigh office should be consulted prior to sampling for either of these.

Distribution:

1. Original to State Laboratory of Public Health

   Environmental Sciences Branch
   P. O. Box 28047
   Raleigh, NC 27611

2. Lab sends copy to Solid and Hazardous Waste Management Branch.
3. Solid and Hazardous Waste Management Branch sends copy to field person.

Disposition: This form may be destroyed in accordance with the Environmental Health, Solid and Hazardous Waste Section of the *Records Disposition Schedule* as published by the North Carolina Division of Archives and History.

Additional forms may be ordered from:

Solid and Hazardous Waste Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602-2091

. C. Department of Human Resources
ivision of Health Services

SAMPLE ANALYSES REQUEST

State Laboratory of Public Health
P. O. Box 28047
306 N. Wilmington Street
Raleigh, 27611

ite Number 2 4 D 000828616 Field Sample Number 003386

Name of Site USS Agrichemicals Farm Serv. Site Location Whiteville, N.C.

Collected By S R Butler ID# 44 Date Collected July 16, 1986 Time 1055

Type of Sample:

Environmental	Concentrate	Comments
✓ Groundwater (1)	___ Solid (5)	Well - Need drinking water std.
___ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		___ Arsenic		___ Silver	
___ Barium		___ Barium		___ Sulfates	
___ Cadmium		___ Cadmium		___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		___ Chromium		___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		___ Lead			
		___ Manganese			
		___ Mercury			
		___ Nitrate			
		___ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
✓ P&T:GC/MS	✓	___ EDB		___ Methoxychlor	
___ Acid:B/N Ext.		___ PCB's		___ Toxaphene	
___ TOX		___ Petroleum		___ 2,4-D	
		___ Endrin		___ 2,4,5-TP (silvex)	
		___ Lindane			

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received 7-17-86 V.P. Date Reported

Date Extracted Date Analyzed PT 9-4-86 MW

Reported By Lab Number 602014

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

*PESTICIDE & HERBICIDE EXTRACTION-FIRST

N. C. Department of Human Resources
Division of Health Services

SAMPLE ANALYSES REQUEST

State Laboratory of Public Health
P. O. Box 28047
306 N. Wilmington Street
Raleigh, 27611

Site Number 24 D000828616 Field Sample Number 003387

Name of Site USS Agrichemicals Farm Lewis Site Location Whiteville, N.C.

Collected By S.R. Butler ID# 44 Date Collected July 16, 1986 Time 1100

Type of Sample:

Environmental	Concentrate	Comments
____ Groundwater (1)	____ Solid (5)	Clay - 48" Depth
____ Surface Water (2)	____ Liquid (6)	
✓ Soil (3)	____ Sludge (7)	Suspected 2,4-D dump*
____ Other (4)	____ Other (8)	

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
____ Arsenic		____ Arsenic		____ Silver	
____ Barium		____ Barium		____ Sulfates	
____ Cadmium		____ Cadmium		____ Zinc	
____ Chromium		____ Chloride		____ Ph	
____ Lead		____ Chromium		____ Conductivity	
____ Mercury		____ Copper		____ TDS	
____ Selenium		____ Fluoride		____ TOC	
____ Silver		____ Iron			
		____ Lead			
		____ Manganese			
		____ Mercury			
		____ Nitrate			
		____ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
____ P&T:GC/MS		____ EDB		✓ Methoxychlor	<0.1 ppm
✓ Acid:B/N Ext.	✓	____ PCB's		✓ Toxaphene	<0.2 ppm
____ TOX		____ Petroleum		✓ 2,4-D	<0.1
		✓ Endrin	<0.01 ppm	✓ 2,4,5-TP (silvex)	<0.1
		✓ Lindane	<0.04 ppm		

MICROBIOLOGY

Parameter
____ (MF) Coliform Colonies/100mls
____ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
____ Gross Alpha	
____ Gross Beta	

Date Received 7-17-86 V.P. Date Reported

Date Extracted B/A 9/9/86 LD; Pest 9/10/86 VP LD Herb 9-11-86 BD Date Analyzed Herb 9-12-86 BD, B/A 9-11-86 BD, PEST. 9-25-86 V.P.

Reported By Lab Number 602015

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

*PESTICIDE + HERBICIDE EXTRACTION - FIRST

C. Department of Human Resources
vision of Health Services

SAMPLE ANALYSES REQUEST

State Laboratory of Public Health
P. O. Box 28047
306 N. Wilmington Street
Raleigh, 27611

te Number NCD000828616 Field Sample Number 003388

Name of Site USS Agrichemicals Farm Serv. Site Location Whitewills, N.C.

ollected By S.R. Butler ID# 44 Date Collected July 16, 1986 Time 1155

Type of Sample:

Environmental	Concentrate	Comments
___ Groundwater (1)	___ Solid (5)	Background
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	Suspected 2,4-D dump.*
___ Other (4)	___ Other (8)	

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		___ Arsenic		___ Silver	
___ Barium		___ Barium		___ Sulfates	
___ Cadmium		___ Cadmium		___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		___ Chromium		___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		___ Lead			
		___ Manganese			
		___ Mercury			
		___ Nitrate			
		___ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ P&T:GC/MS		___ EDB		✓ Methoxychlor	<0.1 ppm
✓ Acid:B/N Ext.	✓	___ PCB's		✓ Toxaphene	<0.2 ppm
___ TOX		___ Petroleum		✓ 2,4-D	<0.1
		✓ Endrin	<0.01 ppm	✓ 2,4,5-TP (silvex)	<0.1
		✓ Lindane	<0.04 ppm		

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received 7-17-86 V.P. Date Reported

Date Extracted BNA 9/9/86 LD; Pest 9/10/86 LD Herb 9-11-86 BD Date Analyzed Herb 9-12-86 BD, BNA 9-11-86 BD, PEST. 9-25-86 V.P.

Reported By Lab Number 602016

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

①

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES	LAB NO	602013	602015	602016			
	FIELD #	3385	3387	3388			
COMPOUND	TYPE	(1)	(3)	(3)	( )	( )	( )
	UNITS	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg
N-nitrosodimethylamine	330	NA	NA	NA			
bis(2-chloroethyl)ether							
2-chlorophenol							
phenol							
1,3-dichlorobenzene							
1,4-dichlorobenzene							
1,2-dichlorobenzene							
bis(2-chloroisopropyl)ether							
hexachloroethane							
N-nitroso-di-n-propylamine							
nitrobenzene							
isophorone							
2-nitrophenol							
2,4-dimethylphenol							
bis(2-chloroethoxy)methane							
2,4-dichlorophenol							
1,2,4-trichlorobenzene							
naphthalene							
hexachlorobutadiene							
4-chloro-m-cresol							
hexachlorocyclopentadiene							
2,4,6-trichlorophenol							
2-chloronaphthalene							
acenaphthylene							
dimethyl phthalate							
2,6-dinitrotoluene							
acenaphthene							
2,4-dinitrophenol	1600						
2,4-dinitrotoluene	330						
4-nitrophenol	1600						
fluorene	330						
4-chlorophenylphenylether	330						
diethyl phthalate	330						
4,6-dinitro-o-cresol	1600						
diphenylamine	330						
azobenzene	1600						
4-bromophenylphenylether	330						
hexachlorobenzene	330						
pentachlorophenol	1600						
phenanthrene	330						
anthracene	330						
dibutyl phthalate	330 B						
fluoranthene	330						

MDL
µg/g soil

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

N.C. Division of Health Services
DHS 3068-0 (4/86 Laboratory)

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COMPOUND	TYPE	(1)	(3)	(3)	( )	( )	( )
	UNITS	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg
pyrene	330	NA	↓	↓			
benzidine	1600	↓	↓	↓			
butyl benzyl phthalate	330	↓	↓	↓			
benz(a)anthracene	330	↓	↓	↓			
chrysene	330	↓	↓	↓			
3,3-dichlorobenzidine	1600	↓	↓	↓			
bis(2-ethylhexyl)phthalate	330	↓	↓	↓			
di-n-octyl phthalate	330	↓	↓	↓			
benzo(b)fluoranthene	1600	↓	↓	↓			
benzo(k)fluoranthene	↓	↓	↓	↓			
benzo(a)pyrene	↓	↓	↓	↓			
indeno(1,2,3-cd)pyrene	↓	↓	↓	↓			
dibenzo(a,h)anthracene	↓	↓	↓	↓			
benzo(g,h,i)perylene	↓	↓	↓	↓			
aniline	1600	NA	↓	↓			
benzoic acid	1600	↓	↓	↓			
benzyl alcohol	330	↓	↓	↓			
4-chloroaniline	330	↓	↓	↓			
dibenzofuran	330	↓	↓	↓			
2-methylnaphthalene	330	↓	↓	↓			
2-methylphenol	330	↓	↓	↓			
4-methylphenol	330	↓	↓	↓			
2-nitroaniline	1600	↓	↓	↓			
3-nitroaniline	1600	↓	↓	↓			
4-nitroaniline	1600	↓	↓	↓			
2,4,5-trichlorophenol	1600	↓	↓	↓			
	MDL						
	µg/g						
	Soil						

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
NA - Not analyzed.
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DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	602014					
	FIELD #	3385					
COMPOUND	TYPE	( )	( )	( )	( )	( )	( )
	UNITS	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg
chloromethane	10	u					
bromomethane	10						
dichlorodifluoromethane	20						
vinyl chloride	10						
chloroethane	10						
methylene chloride	5						
trichlorofluoromethane							
ethene, 1,1-dichloro							
ethane, 1,1-dichloro-							
1,2-trans-dichloroethene							
chloroform							
ethane, 1,2-dichloro-							
ethane, 1,1,1-trichloro-							
carbontetrachloride							
bromodichloromethane							
propane, 1,2-dichloro-							
1,3-trans-dichloropropene							
trichloroethylene							
chlorodibromomethane							
benzene							
ethane, 1,1,2-trichloro-							
1,3-cis-dichloropropene							
2-chloroethyl vinyl ether	10						
bromoform	5						
ethane, 1,1,2,2-tetrachloro-							
ethene, tetrachloro-							
toluene							
chlorobenzene							
ethylbenzene							
acetone	10	u					
2-butanone	10						
carbondisulfide	5						
2-hexanone	10						
4-methyl-2-pentanone	10						
styrene	5						
vinyl acetate	10						
o-xylene	5						
	MDL						
	µg/l						

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

#602014 → 1 unidentified peak

N.C. Division of Health Services
DHS 3068-O (4/86 Laboratory)

Appendix C

References

REFERENCES

1. Site visit report from Jack Butler, NC Solid and Hazardous Waste Management Branch, to Denise Bland, US EPA, 17 July 1986.

2. Letter and attachments from R.B. Flagg, USS Agri Chemicals to Jack Butler, NC Solid and Hazardous Waste Management Branch, 6 December 1985.

3. Telephone conversation between Jack Butler, NC Solid and Hazardous Waste Management Branch, and L.E. Watts, Watts Farm Center, on 5 December 1985.

4. Telephone conversation between Jack Butler, NC Solid and Hazardous Waste Management Branch, and Robert B. Flagg, USS Agri Chemicals Farm Service, on 5 December 1985.

5. Uncontrolled waste site (CERCLA 103(c)) notification, 25 January 1982.

6. RCRA field inspection report, 27 May 1982.

7. Letter from R. B. Flagg, USS Agri Chemicals to US EPA Region IV, 8 December 1983.

8. General Soil Map of North Carolina, by Phillip L. Tant, H.J. Byrd, and R.E. Horton, Soil Conservation Service, U.S. Department of Agriculture.

9. State of North Carolina, Administrative Code, Section 15 NCAC 2B .0310, Classifications and Water Quality Standards Assigned to the Waters of the Lumber River Basin.

10. Reconnaissance of the Ground-Water Resources of the Southport-Elizabethtown Area, NC, by Reginald R. Blankenship, U.S. Geological Survey, 1965, Pgs. 37-47.

11. North Carolina Atlas, Edited by James W. Clay, Douglas M. Orr, Jr., and Alfred W. Stuart. University of North Carolina Press, Chapel Hill, NC, 1975. Pgs. 94, 97, 99, 101, 103, and 104.

12. Uncontrolled Hazardous Waste Site Ranking System, A User's Manual, (HW-10). U.S. EPA, 1984. Pg. 33. Federal Register, Volume 47, No. 137, July 16, 1982, Pg. 31180.

13. North Carolina State Government Statistical Abstract. North Carolina State Data Center. Research and Planning Services, Office of State Budget and Management. Fifth Edition, 1984. Pgs. 260-261, 28-33.

14. Telephone conversation between Jack Butler, NC Solid and Hazardous Waste Management Branch, and Steve Wyatt, Chadbourn Town Manager, on 26 August 1986.

15. Site Investigation Report, Guyton Battery Service, NC D024459471, 9 July 1986.

16. Letter from Steven D. Wyatt, Chadbourn Town Manger, to Jack Butler, Solid and Hazardous Waste Management Branch, 2 August 1986.

17. Telephone conversation between Jack Butler, Solid and Hazardous Waste Management Branch, and Mike Taylor, Whiteville City Engineer, on 27 August 1986.

18. Telephone conversation between Jack Butler, Solid and Hazardous Waste Management Branch, and Belton Blackman, Brunswick Water Superintendent, on 5 September 1986.

19. Telephone conversation between Jack Butler, Solid and Hazardous Waste Management Branch, and Juanita Stanley, Stanley Realty, on 5 September 1986.

20. Permanent files, Water Supply Branch, NC DHR/DHS, 15 July 1986.

21. Letter and enclosures to Pat DeRosa, NC Solid and Hazardous Waste Management Branch, from Warren T. Parker, United States Department of the Interior, 21 June 1985.

22. Memo and attachments to CERCLA Unit staff, from Pat DeRosa, NC CERCLA Unit, 12 August 1986.

23. 1982 Farm Chemicals Handbook, Meister Publishing Company, Willoughby, Ohio.

24. Dangerous Properties of Industrial Materials, Sixth Edition, by N. Irving Sax. Van Nostrand Reinhold Company. 1984.

Ref. 1

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
Phillip J. Kirk, Jr., Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

17 July 1986

Ms. Denise Bland
EPA NC CERCLA Project Officer
Air and Hazardous Material Division
345 Courtland Street, N.E.
Atlanta, GA 30365

Dear Ms. Bland:

SUBJECT: Summary Trip Report
USS Agri Chemicals Farm Service NC D000818616
Highway 701, Route 3, Box 212
Whiteville, NC 28472
Site Investigation Date: 16 July 1986

USS Agri Chemicals Farm Service is an agricultural warehouse that was originally built in 1962. From 1962 until 1979 it was called Farmers Oil and Fertilizer and oil, kerosene, fertilizer, pesticides, and agricultural chemicals were sold at this site. From November 1979 until August 1985, USS Agric Chemical leased the property from Mr. L.E. Watts and sold only agricultural chemicals such as fertilizer and pesticides. Since August 1985 the warehouse has been called Watts Farm Center and agricultural chemicals continue to be sold. Prior to 1962 the property was open farm land.

In 1980 a bulk mixer was purchased which contained solid residue material. Approximately 35 cubic feet of this material was reportedly removed from the mixer and buried on the site. On January 25, 1982 Mr. Robert B. Flagg reported that this material was fertilizer residue containing 2,4-Dichlorophenoxyacetic Acid (2,4-D), a listed hazardous substance. Mr. Flagg also supplied a lab report on water from the on site drinking water well. In Mr. Flaggs report the following chloro-phenoxy herbicides were tested for by gas chromatography: MCPP, Dicamba, 2,4-D, 2,4-DB, Silvex, and 2,4,5-T. No response corresponding to these compounds was detected. The sample was taken on July 28, 1980. A map in Mr. Flagg's report indicates that the well is 388 feet from the burial spot.

Ref.1

On 16 July 1986, Jack Butler, Stan Atwood, and Grover Nicholson, NC DHR/DHS CERCLA Unit, performed a site investigation at this site. After meeting with Mr. L.E. Watts and discussing the burial of this 2,4-D containing material and our objectives, Mr. Watts accompanied us to the general area of the burial. Approximately 12 exploratory holes were augered to depths of about 4 or 5 feet in the burial area. Although no residue material was found, clay from a depth of 48 inches in one location was sampled. This clay was noted to have slight agrichemical type odor. A background soil sample was collected from a depth of 8 inches on the east end of the property. Water from the on site drinking water well was also sampled. Mr. Watts reported that this well was under a paved area in front of the building, was about 50 ft. deep, and had been there since the early 1960s.

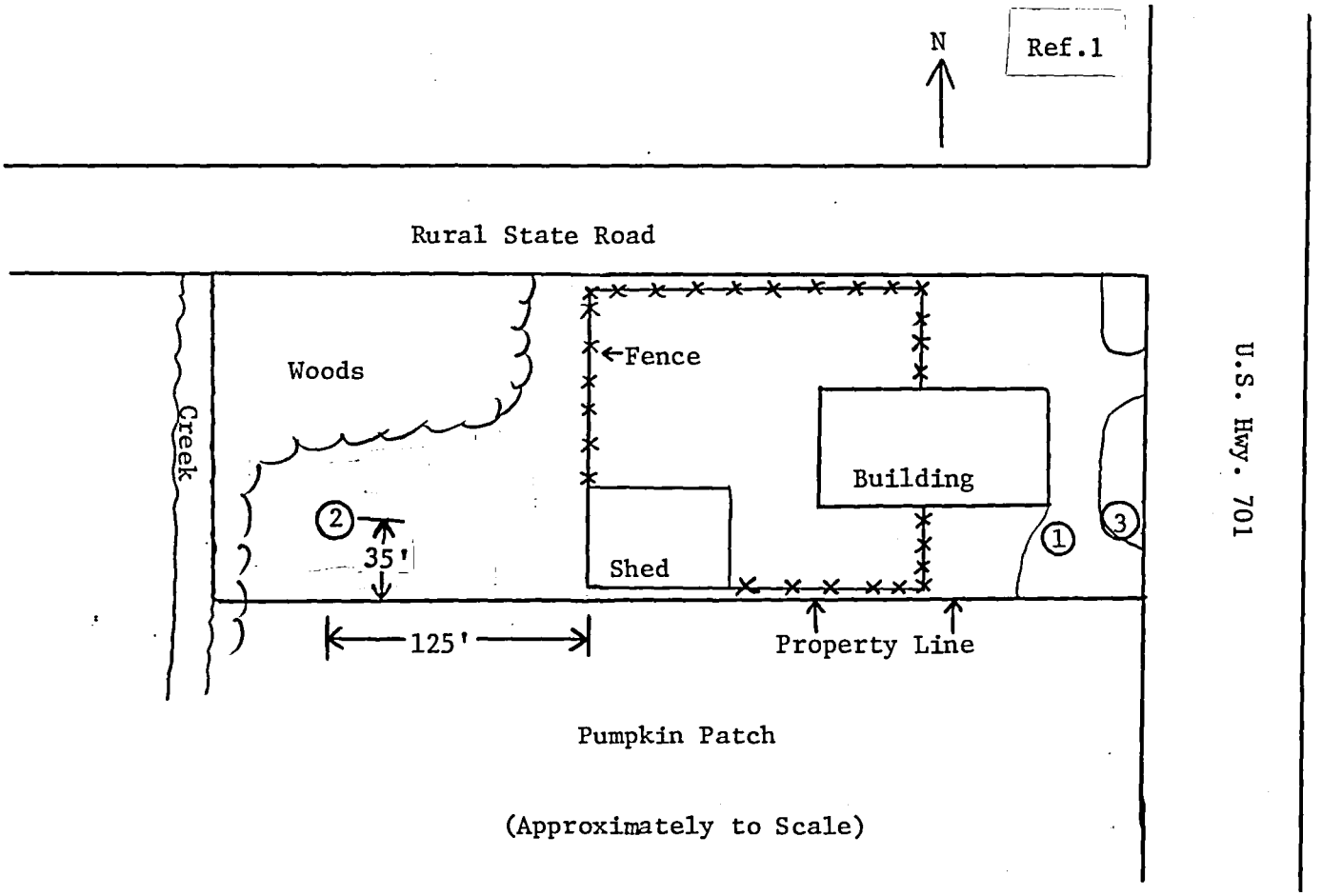
A sketch of this site showing sampling locations is attached. If you have any questions please contact me at (919) 733-2801.

Sincerely,

Jack Butler

Jack Butler, Environmental Engineer
Solid and Hazardous Waste Management Branch
Environmental Health Section

JB/tb/0210b



(Approximately to Scale)

Sampling Points

1. 50 ft. deep drinking water well.
2. 48 inch deep soil sample (in general burial area).
3. 8 inch deep background soil sample.

R.B. FLAGG

USS Agri-Chemicals
Division of United States Steel
P. O. BOX 1685
ATLANTA, GEORGIA 30301

PRESORTED
FIRST-CLASS

ATLANTA GA. DEC 27 '85

U.S. POSTAGE 0.18

MR. JACK BUTLER
NORTH CAROLINA DIV. OF HEALTH SERVICES
P.O. BOX 2091
RALEIGH, N.C. 27602

RECEIVED DEC 9 1985 CERCLA HAZARDOUS WASTE MANAGEMENT BRANCH

Jack Butler
Attached is my file on the 2,4-D buried at Whiteville, N.C. and analysis of the water from our well.
R. B. Flagg
12/6/85

Ref. 2

Ref.2

USS Agri-Chemicals
Division of United States Steel Corporation

Interorganization Correspondence

Date: August 5, 1980

To: R. B. Flagg (11)
Atlanta, GA

From: C. H. McBride (106) CM
Atlanta Technical Center

Subject: Drinking Water
Whiteville, NC

The sample of water from the well at our Whiteville, NC, farm service center was checked for the following chloro-phenoxy herbicides by gas chromatography: MCPP, Dicamba, 2,4-D, 2,4-DB, silvex and 2,4,5-T. No response corresponding to these compounds was detected.

A separate standard corresponding to the Federal drinking water standard of 0.1 mg/l 2,4-D was prepared. With this it was shown that a conservative detection limit for 2,4-D by this procedure would be 0.02 mg/l. The detection limit for the other herbicides listed above would be comparable.

A copy of our lab report is attached.

As you know about one ton of fertilizer containing 2,4-D, MCPP and Dicamba was buried on our property. I had Cliff McBride check a well water sample for contamination. It is assuring to know there is no contamination. Jack

Copies to: R. A. Wiesboeck (106)
Dudley Ray (511 - Tucker)

3252

ANALYTICAL REQUEST AND REPORT Ref. 2 Date 2/28/80

Out 8/4

Project No. 2026 Submitted By RB Flagg

Sample(s) Ident. Water Sample, Whiteville FSC, NC.

Analyses Required 2,4-D or related

Estimated Range: ppm

Major Constituents and History

		Found, ppm (µg/ml)				
2,4-D		Nil	< 0.02 mg/l.			
	Drinking Water Standard = 0.1 mg/l.					
	Related phenoxy herbicides checked:					
		MCPP, Dicamba, 2,4-DB, 2,4,5-T & Silvex – None Found.				

Procedures and/or Remarks

To:

USS AGRI - CHEMICALS
ATLANTA TECHNICAL CENTER
DECATUR, GEORGIA 30033

Approved

for Follow-U

Ref. 2

881-2234

Received a call 4/16/82 from Wayne Mathis EPA Region IV, Atlanta. He will be in Wilmington Monday 4/19/82 and wants to check on fertilizer containing 2,4-D which is buried on our property. He will be at Whiteville late in the afternoon.

919-642-4006

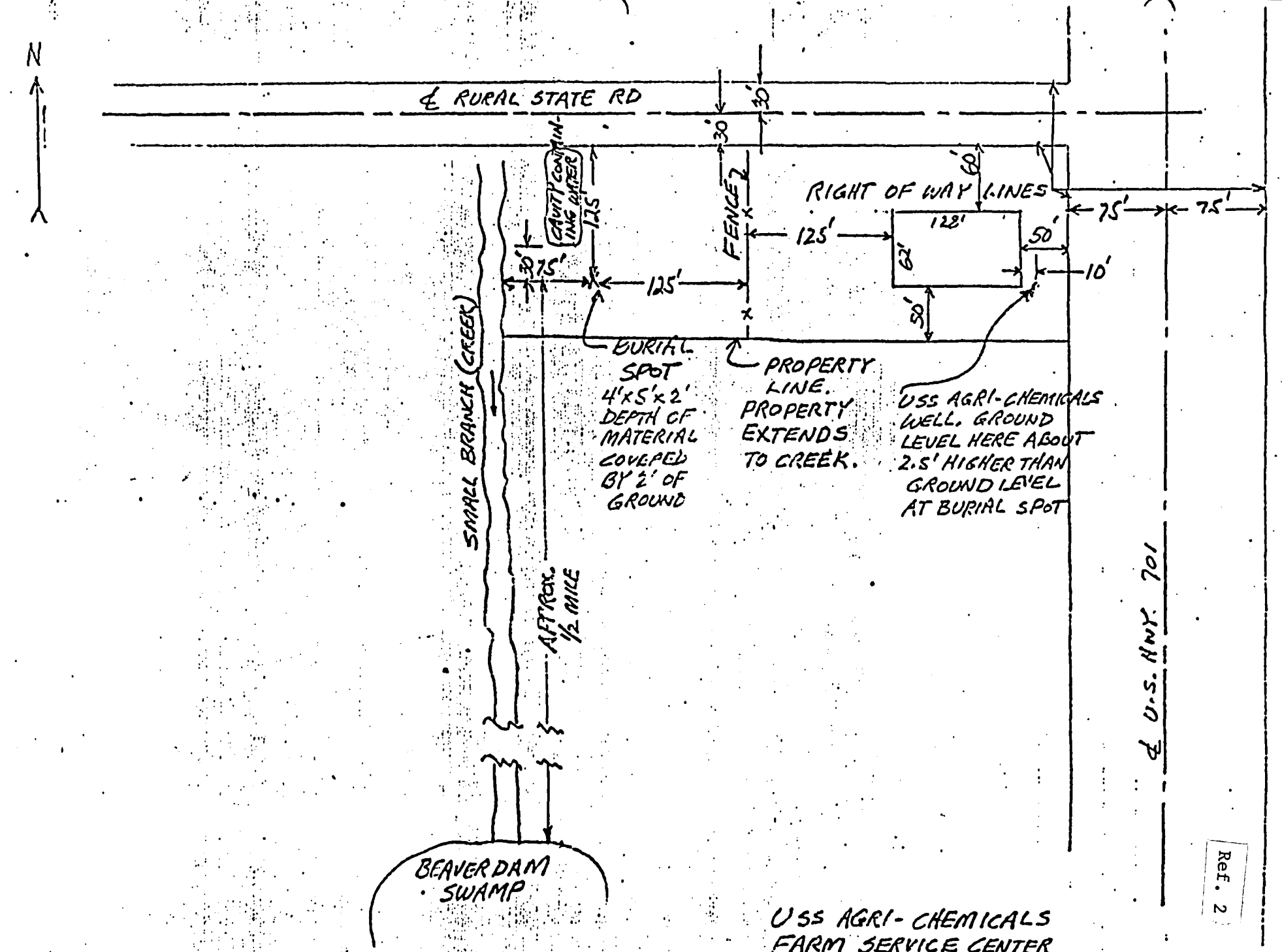
I called Mgr. Ellwood Watts on 4/16/82 to notify him of EPA visit and to make sure he will be there and then notified Wayne Mathis it is OK for him to make the visit.

Jim Stouts is the supervisor. He is located in Wilmington

Wayne Mathis arrived after normal quitting time (5:00 P.M.). Ellwood Watts had left so he talked with our salesman. He indicated situation O.K. We were not told to do anything. We don't know whether we will receive a letter or report on the inspection.

Nothing received from EPA.

R.B. Flagg
12/6/85


N
℄ RURAL STATE RD
30'
30'
CAUTION CONTAINING WATER
125'
FENCE
RIGHT OF WAY LINES
60'
125'
128'
62'
50'
10'
50'
75'
75'
30'
75'
125'
BURIAL SPOT 4'x5'x2' DEPTH OF MATERIAL COVERED BY 2' OF GROUND
PROPERTY LINE. PROPERTY EXTENDS TO CREEK.
USS AGRI-CHEMICALS WELL. GROUND LEVEL HERE ABOUT 2.5' HIGHER THAN GROUND LEVEL AT BURIAL SPOT
SMALL BRANCH (CREEK)
APPROX. 1/2 MILE
℄ U.S. HWY. 701
BEAVER DAM SWAMP
USS AGRI-CHEMICALS
FARM SERVICE CENTER
WHITEVILLE, N.C.
APPROX. 1.8 ACRES

Ref. 2

Ref.3

DATE: December 5, 1985

TO: File

FROM: Jack Butler

SUBJECT: Telephone conversation with L.E. Watts [(919) 642-4006] about USS Agri. Chem. Farm Service NC D000828616.

Mr. L.E. Watts reported that this facility is an agricultural warehouse and was originally built in 1962. From 1962 until 1979 it was called Farmers Oil and Fertilizer and oil, kerosene, fertilizer, pesticides, and other agricultural chemicals were sold from this site. From November 1979 until August 1985, USS Agri Chemical leased the property from Mr. L.E. Watts and sold only agricultural chemicals. Since August 1985 the warehouse has been called Watts Farm Center and fertilizer and pesticides continue to be sold. Prior to 1962 the property was open farm land.

In 1980 a bulk mixer was purchased which contained residue of unknown materials. Approximately 2 1/2 tons of this material was removed and buried in a large hole in the back of the property.

Mr. Watts reported that drinking water for the building is obtained from a well on site which is approximately 50 to 60 feet deep.

JB/tb/0210b

Ref.4

DATE: December 5, 1985

TO: File

FROM: Jack Butler

SUBJECT: Telephone conversation with Robert B. Flagg [(404) 572-4366] about USS Agri Chemical Farm Service NC D000828616.

Mr. Flagg of USS Agri Chemical Services in Pittsburgh, PA reported that in 1980 a 6' - 7' diameter, 4' - 5' long fertilizer mixing vat was bought from a manufacturer in upstate New York. A fertilizer residue was removed from this mixer and buried on the site. About one year later NRCD was notified of this burial and the well on the site was tested for 2,4-D. No contamination was found. Mr. Flagg agreed to look for the lab report and forward a copy to me if he could find it.

JB/tb/0210b

Ref.5

Date: January 25, 1982

County: Columbus

Notifier's name and address: Robert B. Flagg

600 Grant St., Pittsburgh, PA. 15230

Contact's name: Robert B. Flagg (404) 572-4366

Site name and address: USS Agri-Chemicals Farm Service Center.

Hwy. 701, Whiteville, North Carolina 28472

Site location: Hwy. 701, Whiteville, N. C.

Type of waste: Leftover Fertilizer Residue (Containing 2,4-D) Cleaned from newly purchased, but used, bulk mixer

What process generated the waste?

Volume of waste: 35 cubic feet

Method of storage or disposal: Burial on property

Dates of waste activity: 1980

Site history: Robert B. Flagg of USS Agri-Chemicals Farm Service Center in Whiteville reported the burial of about 35 cubic feet of leftover fertilizer residue on USS Agri-Chemicals property on Highway 701. The fertilizer contained 2,4-D, a listed hazardous waste..

NCD 000 828 616

GEN

*The preceding information is based on preliminary data supplied by the Environmental Protection Agency, and not on detailed site investigations.

Ref.6

ENTERED
MAY 27 1982
DATA PROCESSING

1. Facility

USS Farm Service Center
Route 3, Box 212
Highway 701 South
Whiteville, NC 28472
Columbus County
Contact: Mr. L.E. Watts, Manager
(919) 642-4006
EPA ID# NCD000828616

2. Date of Inspection

April 6, 1982

3. Participants

Mr. L.E. Watts, Manager
Mr. Ray Church, District Sanitarian, Eastern Regional Office

4. Comments

This facility is a distributor of farm chemicals. Since they handle many hazardous materials at this facility, many which are acutely toxic and would be hazardous waste if spilled, it is the wishes of the corporate office in Atlanta to retain their EPA ID numbers.

On Monday April 12, 1982 I spoke with Mr. David Nickerson (404) 572-4105 regarding this matter. Since there are several USS Farm Service Centers located throughout North Carolina I advised Keith Lawson to contact Mr. Nickerson in order to remove these facilities from the large quantity ~~generator~~ inventory.

Not a gen

COUNTY OF Columbus EPA I.D.# NCD008286616

SMALL HAZARDOUS WASTE GENERATOR SURVEY

Ref.6

1. GENERAL INFORMATION:

Name of Facility: USS Farm Service Center

Facility Contact: L.E. Watts Phone: 919 642-4006

Facility Location: Rt. 3 Box 212

Street: Hwy 701

City: Whiteville NC. Zip Code: 28472

2. NATURE OF BUSINESS: (Provide Brief Description)

Distributor of farm chemicals

3. NATURE OF HAZARDOUS WASTES: (Provide Brief Explanation)

None generated

4. DESCRIPTION OF HAZARDOUS WASTE:

A	B	C	D	E	F*	G*	H
Hazardous Waste #	Annual Quantity	Unit Meas.	Storage	Treat-ment	Transpor-tation	Disposal	Manifest Available (Yes or No)
None	None						

*Provide name, address and I.D. # of transporter and disposal site in comments.

5. COMMENTS:

retained due to potential waste generation in case of fire or spill

6. DATE OF SURVEY: 4-6-82

By: Ray Church Department: DHR SSHWMB

(Instructions on Reverse)

USS Agri-Chemicals
Division of United States Steel

233 PEACHTREE ST., N.E.
ATLANTA, GEORGIA
MAIL: P.O. BOX 1685
ATLANTA, GEORGIA 30301
404/572-4000

Ref.7

RECEIVED
DEC 12 1983
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

December 8, 1983

U. S. Environmental Protection Agency Region IV
345 Courtland St.
Atlanta, Ga. 30365

Attn: Hazardous Waste Div.

Gentlemen:

Re: EPA I.D. No. NCD000828608 - Ayden, N.C.
EPA I.D. No. NCD000828657 - Benson, N.C.
EPA I.D. No. NCD097579942 - Conway, N.C.
EPA I.D. No. NCD000828665 - Snow Hill, N.C.
EPA I.D. No. NCD000828640 - Wallace, N.C.
EPA I.D. No. NCD000828616 - Whiteville, N.C.
Halifax also

The above facilities have never generated any hazardous waste. The only reason we gave notification to Environmental Protection Agency of Hazardous Waste Activity was in order to get an I.D. No. in case we ever generated any hazardous waste. Now that it is possible to obtain an I.D. No. over the phone if we generate any hazardous waste, please cancel the above I.D. Nos.

Cancellation of the I.D. Nos. will eliminate annual reports, surveys, etc. and eliminate paperwork for the government and the Company.

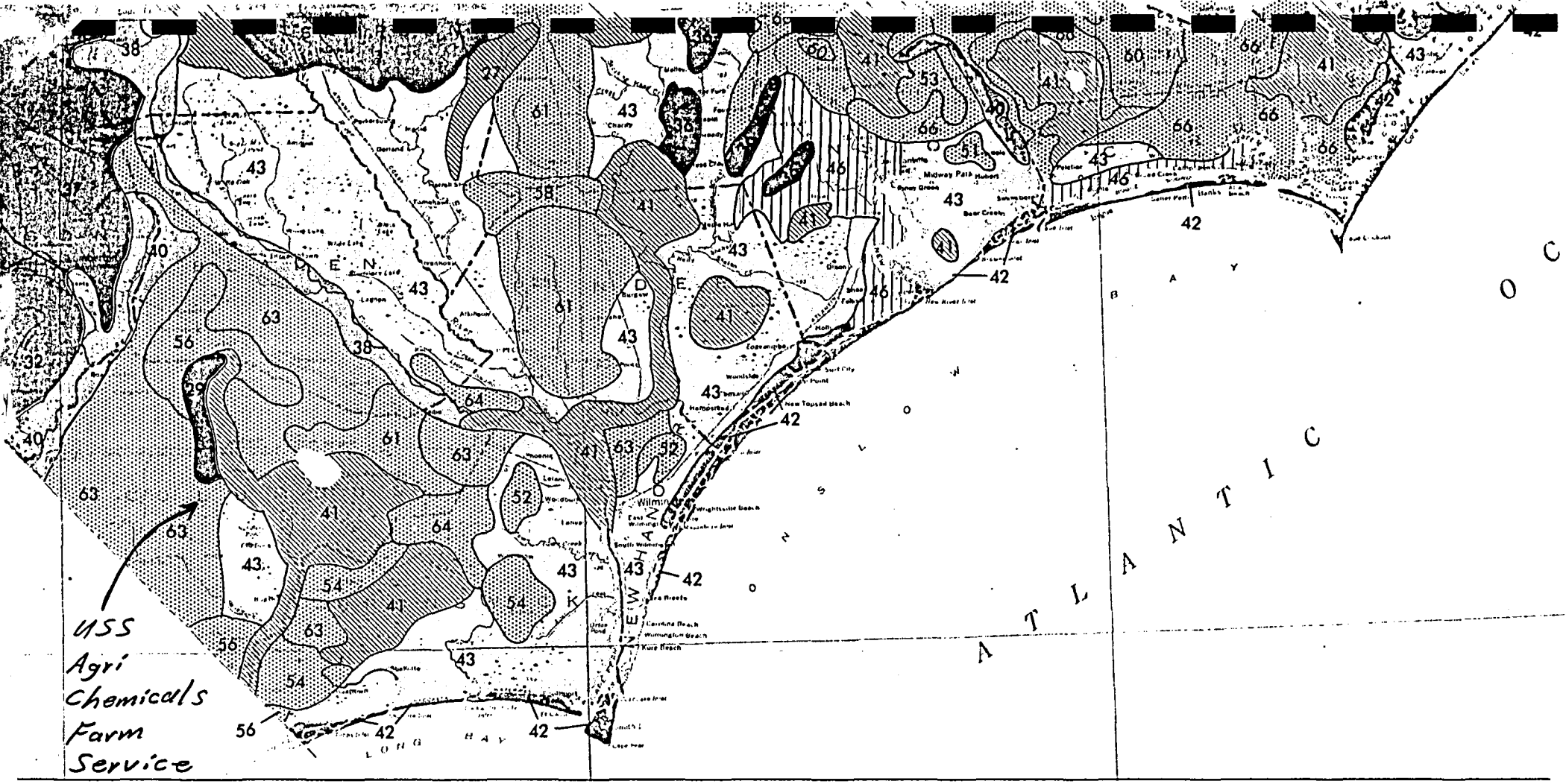
Yours very truly,

USS AGRI-CHEMICALS

R. B. Flagg

R. B. Flagg
Mgr. Environmental Control

RBF:jap
cc: State of North Carolina
Dept. of Human Resources
Div. of Health Services
Solid & Hazardous Waste Management Branch
P. O. Box 2091
Raleigh, N.C. 27602-2091



GENERAL SOIL MAP OF NORTH CAROLINA

Map prepared by Phillip L. Tant, H. J. Byrd and R. E. Horton, Soil Conservation Service, U. S. Department of Agriculture

Published for The Soil Conservation Service by the Engineer Agency for Resources Inventories (EARI), U. S. Army Engineer Topographic Laboratories. Cartopography by Larry B. Staley.

Ref. 8

Soil associations have been adapted from sheets 10 and 11 of a "Soil Map of United States" as associations of phases of subgroups. Major references used in its adaptation were (a) general soil maps of Counties of North Carolina and (b) The Soils of North Carolina, Technical Bulletin Number 115, dated December 1955, by William D. Lee. Soil series names are tentative in portions of the state where detailed mapping is lacking.

Scale 1:1,000,000

10 0 10 20 30 40 Miles

10 0 10 20 30 40 50 Kilometers

Ref.8

Atlantic Coast Flatwoods—A region of nearly level coastal plain cut by broad valleys with meandering streams. Local relief is mainly a few feet to ten or twenty feet. Most of the land is in farms though shallow lakes, bogs, and swamps are extensive in some areas.

Organic soils of shallow lake beds and river swamps.

41 Ponzer-Pamlico-Dorovan

Marsh and dunes of coastal areas.

42 Capers-Newhan

Wet sandy soil of broad ridges.

43 Chipley-Lynn Haven-Leon

Wet lowlands along stream valleys.

44 Wehadkee-Roanoke

45 Chewacla-Wehadkee

Sandy and loamy soils of uplands.

46 Lakeland-Kenansville

47 Lakeland-Pactolus

48 Lakeland-Bertie-Dragston

Loamy and clayey soils of wet lowlands.

49 Weeksville-Pasquotank

50 Bladen-Bayboro

51 Bladen-Lenoir-Hyde

52 Leaf-Lenoir-Craven

53 Bladen-Lenoir

54 Bladen-Dunbar-Craven

55 Bertie-Woodington

56 Craven-Marlboro-Bladen

57 Craven-Leaf-Lenoir

58 Craven-Bladen-Bertie

59 Coxville-Exum

60 Lenoir-Leaf

61 Lynchburg-Dunbar-Rains

62 Lenoir-Craven-Coxville

63 Dunbar-Lynchburg-Goldsboro

64 Hyde-Pocomoke-Rutlege

65 Bayboro-Hyde

66 Portsmouth-Woodington

Ref.8

MAP SYMBOL	SOIL ASSOCIATION NAME	TOPOGRAPHIC SETTING	MINOR SOILS IN ASSOCIATION
	ATLANTIC COAST FLATWOODS		
41	Ponzer-Pamlico-Dorovan	Swamps and marshes	Torhunta Johnston
42	Capers-Newhan	Marshes and associated dunes and beaches along coast	
43	Chipley-Lynn Haven-Leon	Level wet uplands underlain mainly by medium sands	Johnston Rutlege Torhunta
44	Wehadkee-Roanoke	Level swampy alluvial plains subject to overflow	Lumbee Johns
45	Chewacla-Wehadkee	Level floodplains, wet in part, underlain by sediments washed from gneisses, schists and other rock	Congaree Wagram
46	Lakeland-Kenansville	Sloping coastal plain, duned in part, underlain mainly by medium and coarse sands	Chipley Pactolus
47	Lakeland-Pactolus	Sloping coastal plain, duned in part, underlain mainly by medium and coarse sands	Chipley Wagram
48	Lakeland-Bertie-Dragston	Level uplands and terraces underlain by coastal plain sediments and stream alluvium	
49	Weeksville-Pasquotank	Level wet uplands or terraces underlain by silty marine or fluvial sediments	Barclay Bladen
50	Bladen-Bayboro	Low lying marine terrace of clayey sediments	Lenoir Rains
51	Bladen-Lenoir-Hyde	Level wet uplands and terraces underlain by clayey sediments	
52	Leaf-Lenoir-Craven	Level wet uplands and terraces underlain by clayey sediments	Bladen Lumbee
53	Bladen-Lenoir	Level wet uplands and terraces underlain by clayey sediments	Craven
54	Bladen-Dunbar-Craven	Level plains and depressions underlain by clayey sediments	Lenoir
55	Bertie-Woodington	Somewhat wet level uplands and terraces underlain by loamy sediments	Stallings
56	Craven-Marlboro-Bladen	Somewhat wet level uplands and terraces underlain by clayey sediments	Dunbar
57	Craven-Leaf-Lenoir	Level somewhat wet uplands underlain by clayey sediments	Bertie Bladen
58	Craven-Bladen-Bertie	Level dominatly wet uplands underlain by clayey sediments	Johns Lumbee
59	Coxville-Exum	Level somewhat wet uplands underlain by clayey and silty sediments	Bladen
60	Lenoir-Leaf	Level somewhat wet uplands and terraces underlain by clayey sediments	Bladen
61	Lynchburg-Dunbar-Rains	Level somewhat wet uplands and terraces underlain by clayey and loamy sediments	Duplin Norfolk
62	Lenoir-Craven-Coxville	Level somewhat wet uplands underlain by clayey sediments	Byars
63	Dunbar-Lynchburg-Goldsboro	Level somewhat wet uplands underlain by clayey and loamy sediments	Norfolk Rains
64	Hyde-Pocomoke-Rutlege	Level very wet uplands and terraces underlain by loamy and clayey sediments	Portsmouth Torhunta
65	Bayboro-Hyde	Level very wet uplands and terraces underlain by loamy and clayey sediments	Torhunta Portsmouth
66	Portsmouth-Woodington	Level wet uplands and terraces underlain by loamy sediments	Stallings

SOIL SERIES	DESCRIPTION			SELECTED INTERPRETATIONS				
	DEPTH TO BEDROCK (Feet)	SHRINK-SWELL POTENTIAL	FLOODING	SUITABILITY FOR		LIMITATIONS FOR		
				GENERAL AGRICULTURE	TIMBER & PULP WOOD	DWELLING	EXCAVATIONS	SEPTIC TANK FILTER FIELDS
ATLANTIC COAST FLATWOODS								
Bayboro	> 10	Moderate	Severe	Fair	Good	Severe	Severe	Severe
Bertie	> 10	Low	Slight	Fair	Fair	Severe	Severe	Severe
Bladen	> 10	Moderate	Slight	Fair	Good	Severe	Severe	Severe
Capers	> 10	High	Severe	Poor	Poor	Severe	Severe	Severe
Chewacla	> 4	Low	Severe	Fair	Good	Severe	Severe	Severe
Chipley	> 10	Low	Slight	Fair	Fair	Moderate	Moderate	Moderate
Coxville	> 10	Low	Slight	Fair	Good	Severe	Severe	Severe
Craven	> 10	Moderate	Slight	Fair	Fair	Severe	Severe	Severe
Dorovan	> 10	Low	Severe	Poor	Poor	Severe	Severe	Severe
Dragston	> 10	Low	Slight	Fair	Good	Severe	Severe	Severe
Dunbar	> 10	Low	Slight	Good	Good	Severe	Severe	Severe
Exum	> 10	Low	Slight	Good	Good	Moderate	Moderate	Severe
Goldsboro	> 10	Low	Slight	Good	Good	Moderate	Moderate	Severe
Hyde	> 10	Low	Severe	Fair	Good	Severe	Severe	Severe
Kenansville	> 10	Low	Slight	Fair	Fair	Slight	Slight	Slight
Lakeland	> 10	Low	Slight	Poor	Poor	Moderate Severe	Moderate Severe	Moderate Severe
Leaf	> 10	Moderate	Severe	Fair	Good	Severe	Severe	Severe
Lenoir	> 10	Moderate	Slight	Fair	Good	Severe	Severe	Severe
Leon	> 10	Low	Slight	Poor	Poor	Severe	Severe	Severe
Lynchburg	> 10	Low	Slight	Good	Good	Severe	Severe	Severe
Lynn Haven	> 10	Low	Severe	Poor	Poor	Severe	Severe	Severe
Marlboro	> 10	Low	Slight	Good	Good	Moderate	Moderate	Moderate
Newhan	> 10	Low	Moderate	Poor	Poor	Severe	Severe	Severe
Pactolus	> 10	Low	Slight	Poor	Fair	Severe	Severe	Severe
Pamlico	> 10	Low	Severe	Poor	Poor	Severe	Severe	Severe
Pasquotank	> 10	Low	Slight	Good	Good	Severe	Severe	Severe
Pocomoke	> 10	Low	Severe	Fair	Good	Severe	Severe	Severe
Ponzer	> 10	Low	Severe	Poor	Poor	Severe	Severe	Severe
Portsmouth	> 10	Low	Severe	Fair	Good	Severe	Severe	Severe
Rains	> 10	Low	Severe	Fair	Fair	Severe	Severe	Severe
Roanoke	> 10	Moderate	Moderate	Fair	Good	Severe	Severe	Severe
Rutlege	> 10	Low	Severe	Fair	Fair	Severe	Severe	Severe
Weeksville	> 10	Low	Moderate	Good	Good	Severe	Severe	Severe
Wehadkee	> 4	Low	Severe	Poor	Fair	Severe	Severe	Severe
Woodington	> 10	Low	Slight	Fair	Good	Severe	Severe	Severe

Ref.9

STATE OF NORTH CAROLINA

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

CLASSIFICATIONS AND WATER QUALITY STANDARDS ASSIGNED TO THE WATERS OF THE LUMBER RIVER BASIN

DIVISION OF ENVIRONMENTAL MANAGEMENT

RALEIGH, NORTH CAROLINA

Reprint from North Carolina Administrative Code: 15 NCAC 2B .0310
Current Through: June 30, 1981

.0301 CLASSIFICATIONS; GENERAL

(a) Schedule of Classifications. The classifications assigned to the waters of the State of North Carolina are set forth in the schedules of classifications and water quality standards assigned to the waters of the river basins of North Carolina, 15 NCAC 2B .0302 to .0317. These classifications are based upon the existing or contemplated best usage of the various streams and segments of streams in the basin, as determined through studies and evaluations and the holding of public hearings for consideration of the classifications proposed.

(b) Stream Names. The names of the streams listed in the schedules of assigned classifications were taken as far as possible from United States Geological Survey topographic maps. Where topographic maps were unavailable, U.S. Corps of Engineers maps, U.S. Department of Agriculture soil maps, and North Carolina highway maps were used for the selection of stream names.

(c) Classifications. The classifications assigned to the waters of North Carolina are denoted by the letters A-I, A-II, B, C, SA, SB, and SC in the column headed "class." These class designations refer to the classifications established by the Rules, Regulations, Classifications and Water Quality Standards Applicable to the Surface Waters of North Carolina, as adopted by the North Carolina Board of Water and Air Resources on October 13, 1970, and approved by the Environmental Protection Agency on January 20, 1971. A brief explanation of the "best usage" for which the waters in each class must be protected is given as follows:

Fresh Waters

Class A-1:	source of water supply for drinking, culinary, or food processing purposes after treatment by approved disinfection only, and any other usage requiring waters of lower quality;
Class A-II:	source of water supply for drinking, culinary, or food processing purposes after approved treatment equal to coagulation, sedimentation, filtration, and disinfection, etc., and any other usage specified by the "C" classification;
Class B:	primary recreation and any other usage specified by the "C" classification;
Class C:	fish and wildlife propagation, secondary recreation, agriculture and other uses requiring waters of lower quality.

Tidal Salt Waters

Class SA:	shellfishing for market purposes and any other usage specified by the "SB" and "SC" classification;
Class SB:	primary recreation and any other usage specified by the "SC" classification;
Class SC:	fish and wildlife propagation, secondary recreation, and other uses requiring waters of lower quality.

(d) Water Quality Standards. The water quality standards applicable to each classification assigned are those established in 15 NCAC 2B .0200, Classifications and Water Quality Standards Applicable to the Surface Waters of North Carolina, as adopted by the North Carolina Environmental Management Commission.

(e) Designation

(1) Trout Waters. Those streams suitable for the propagation of natural trout and those suitable for the maintenance of trout when stocked by the North Carolina Wildlife Resources Commission are designated in the appropriate columm in the schedule of classifications by the letters "Tr."

(2) Swamp Waters. Those waters which are topographically located so as to generally have low velocities and certain other characteristics which are different from adjacent streams draining steeper topography are designated by the letters "Sw" in the schedule.

(f) Index Number

(1) Reading the Index Number. The index number appearing in the column so designated is an identification number assigned to each stream or segment of a stream, indicating the specific tributary progression between the main stem stream and the tributary stream.

(2) Cross-Referencing the Index Number. The inclusion of the index nmber in the Schedule is to provide an adequate cross reference between the classification schedules and an alphabetic list of streams.

(g) Classification Date. The classification date indicates the date on which enforcement of the provisions of Section 143-215.1 of the General Statutes of North Carolina became effective with reference to the classification assigned to the various streams in North Carolina .

(h) Reference. Copies of the schedules of classifications adopted and assigned to the waters of the various river basins may be obtained at no charge by writing to:

Director
Division of Environmental Management
Department of Natural Resources
and Community Development
Post Office Box 27687
Raleigh, North Carolina 27611

History Note: Statutory Authority G.S. 143-214.1; 143-215.1; 143-215.3(a)(1); Eff. February 1, 1976; Amended Eff. September 9, 1979; November 1, 1978; March 1, 1977.

Note: Nutrient Sensitive Waters: Waters which are experiencing or are subject to excessive growths of microscopic or macroscopic vegetation or which are tributary to such waters. (Nitrogen and phosphorus are the usually controlled nutrients but other parameters may be restricted.) They are designated in the schedule of classifications by the letters "NSW".

Name of Stream	Description	Classification Class	Date	Index No.
East Prong Juniper Creek	From source to Juniper Creek	A-II Sw	12/1/63	14-34-4-3-3
Wilkes Branch	From source to Juniper Creek	A-II Sw	12/1/63	14-34-4-3-4
Beaver Dam Creek	From source to Juniper Creek	A-II Sw	12/1/63	14-34-4-3-5
Little Juniper Creek	From source to Juniper Creek	A-II Sw	12/1/63	14-34-4-3-6
Shoe Heel Creek (Big Shoe Heel Creek) (Maxton Pond)	From Jordan Creek to North Carolina-South Carolina State Line	C Sw	12/1/63	14-34-(5)
McCormick Pond	Entire pond and connecting stream to Shoe Heel Creek	C Sw	12/1/63	14-34-6
Maxton Branch	From source to Maxton Pond, Shoe Heel Creek	C Sw	9/1/74	14-34-7
Jowers Branch	From source to Shoe Heel Creek	C Sw	12/1/63	14-34-8
Frazier Branch	From source to Shoe Heel Creek	C Sw	12/1/63	14-34-9
McRae Branch	From source to Shoe Heel Creek	C Sw	12/1/63	14-34-10
McGregor Branch	From source to Shoe Heel Creek	C Sw	12/1/63	14-34-10.5
Wilkinson Creek	From source to Shoe Heel Creek	C Sw	12/1/63	14-34-11
Watering Hole Swamp	From source to Wilkinson Creek	C Sw	12/1/63	14-34-11-1
Middle Branch	From source to Wilkinson Creek	C Sw	12/1/63	14-34-11-2
First Swamp	From source to Wilkinson Creek	C Sw	12/1/63	14-34-11-3
Short Swamp	From source to Wilkinson Creek	C Sw	12/1/63	14-34-11-4
Mitchell Swamp	From source to North Carolina-South Carolina State Line	C Sw	9/1/74	14-35
Town Ditch	From source to Mitchell Swamp	C Sw (1)	3/1/77	14-35-1
Bracey Swamp	From source to Mitchell Swamp	C Sw	9/1/74	14-35-1.5
Contrary Swamp	North Carolina Portion	A-II Sw	3/1/77	14-35-2
Huggins Creek	From source to North Carolina-South Carolina State Line	B Sw	3/1/77	14-36
Calf Ford Creek	From source to North Carolina-South Carolina State Line	B Sw	3/1/77	14-36-1
	WACCAMAW RIVER DRAINAGE AREA			
WACCAMAW RIVER	From source at dam at Lake Waccamaw to N.C. Hwy. 904	C Sw	12/1/63	15-(1)
Lake Waccamaw	Entire Lake	B Sw	12/1/63	15-2
Unnamed Tributary near Artesia	From source to Lake Waccamaw	C Sw	9/1/74	15-2-1
Unnamed Tributary at Wananish	From source to Lake Waccamaw	C Sw	9/1/74	15-2-2
Little Creek	From source to Lake Waccamaw	C Sw	12/1/63	15-2-3
Second Creek	From source to Lake Waccamaw	C Sw	12/1/63	15-2-4
Third Creek	From source to Lake Waccamaw	C Sw	12/1/63	15-2-5
Big Creek	From source to Lake Waccamaw	C Sw	12/1/63	15-2-6
Buckhead Branch	From source to Big Creek	C Sw	12/1/63	15-2-6-1
Gum Swamp	From source to Big Creek	C Sw	12/1/63	15-2-6-2
Ricefield Branch	From source to Gum Swamp	C Sw	12/1/63	15-2-6-2-1
Fryer Swamp (Council Millpond)	From source to Big Creek	C Sw	12/1/63	15-2-6-3
Boggy Branch	From source to Fryer Swamp	C Sw	12/1/63	15-2-6-3-1
Meares Millpond	Entire Millpond and connecting stream to Fryer Swamp	C Sw	12/1/63	15-2-6-3-2
Sasspan Branch	From source to Fryer Swamp	C Sw	12/1/63	15-2-6-3-3
Slap Swamp	From source to Big Creek	C Sw	12/1/63	15-2-6-4
Slap Branch	From source to Slap Swamp	C Sw	12/1/63	15-2-6-4-1
Reedy Branch	From source to Slap Swamp	C Sw	12/1/63	15-2-6-4-2
Ward Branch	From source to Slap Swamp	C Sw	12/1/63	15-2-6-4-3
Richlands Branch	From source to Slap Swamp	C Sw	12/1/63	15-2-6-4-4
Dam Branch	From source to Richlands Branch	C Sw	12/1/63	15-2-6-4-4-1
Creek Branch	From source to Slap Swamp	C Sw	12/1/63	15-2-6-4-5
Horse Creek	From source to Creek Branch	C Sw	12/1/63	15-2-6-4-5-1
Bogue Swamp	From source to Waccamaw River	C Sw	12/1/63	15-3
Spring Branch	From source to Bogue Swamp	C Sw	12/1/63	15-3-1
White Oak Branch	From source to Bogue Swamp	C Sw	12/1/63	15-3-2
Boggy Branch	From source to Bogue Swamp	C Sw	12/1/63	15-3-3
Cowpen Branch	From source to Bogue Swamp	C Sw	12/1/63	15-3-4

Name of Stream	Description	Classification Class	Date	Index No.
Jockey Branch	From source to Bogue Swamp	C Sw	9/1/74	15-3-5
Palmetto Branch	From source to Bogue Swamp	C Sw	12/1/63	15-3-6
Big Fork	From source to Palmetto Branch	C Sw	12/1/63	15-3-6-1
Alligator Branch	From source to Bogue Swamp	C Sw	9/1/74	15-3-7
Slab Run (Slat Run)	From source to Bogue Swamp	C Sw	12/1/63	15-3-8
White Marsh	From source to Waccamaw River	C Sw	12/1/63	15-4
Red Hill Swamp	From source to White Marsh	C Sw	12/1/63	15-4-1
Brown Marsh	From source to Red Hill Swamp	C Sw	7/1/73	15-4-1-1
Brown Marsh Swamp	From source to Brown Marsh	C Sw	7/1/73	15-4-1-1-1
Mill Race	From source to Brown Marsh Swamp	C Sw	9/1/74	15-4-1-1-1-1
Whites Creek	From source to Brown Marsh Swamp	C Sw	7/1/73	15-4-1-1-1-2
Little Whites Creek	From source to Whites Creek	C Sw	7/1/73	15-4-1-1-1-2-1
Horsepen Branch	From source to Whites Creek	C Sw	7/1/73	15-4-1-1-1-2-2
Elkton Marsh	From source to Brown Marsh	C Sw	7/1/73	15-4-1-1-2
Doubles Branch	From source to Elkton Marsh	C Sw	9/1/74	15-4-1-1-2-1
Horeshoe Swamp	From source to Elkton Marsh	C Sw	9/1/74	15-4-1-1-2-2
Lamb Branch	From source to Horseshoe Swamp	C Sw	9/1/74	15-4-1-1-2-2-1
Little Horseshoe Swamp	From source to Horseshoe Swamp	C Sw	9/1/74	15-4-1-1-2-2-2
Bee Tree Branch	From source to Little Horseshoe Swamp	C Sw	9/1/74	15-4-1-1-2-2-2-1
Pine Log Swamp	From source to Horseshoe Swamp	C Sw	9/1/74	15-4-1-1-2-2-3
Little Pine Log Swamp	From source to Pine Log Swamp	C Sw	9/1/74	15-4-1-1-2-2-3-1
Shipman Branch (Shimman Branch)	From source to Pine Log Swamp	C Sw	9/1/74	15-4-1-1-2-2-3-2
Mill Branch	From source to Elkton Marsh	C Sw	7/1/73	15-4-1-1-2-3
Middle Swamp	From source to Elkton Marsh	C Sw	7/1/73	15-4-1-1-2-4
Box Branch	From source to Middle Swamp	C Sw	9/1/74	15-4-1-1-2-4-1
Eastern Prong	From source to Middle Swamp	C Sw	9/1/74	15-4-1-1-2-4-2
Benson Branch	From source to Middle Swamp	C Sw	9/1/74	15-4-1-1-2-4-3
Big Foot Marsh	From source to Brown Marsh	C Sw	9/1/74	15-4-1-1-3
Slades Swamp	From source to Red Hill Swamp	C Sw	9/1/74	15-4-1-2
Mill Branch	From source to Red Hill Swamp	C Sw	9/1/74	15-4-1-3
Western Prong Creek	From source to White Marsh	C Sw	7/1/73	15-4-2
Greens Branch	From source to Western Prong Creek	C Sw	9/1/74	15-4-2-1
Big Branch	From source to Western Prong Creek	C Sw	9/1/74	15-4-2-2
Browders Branch	From source to Western Prong Creek	C Sw	9/1/74	15-4-2-3
Butler Branch	From source to Western Prong Creek	C Sw	9/1/74	15-4-2-4
Curries Branch	From source to Butler Branch	C Sw	9/1/74	15-4-2-4-1
Troy Mill Branch	From source to White Marsh	C Sw	9/1/74	15-4-3
Bridges Lake	Entire lake and connecting stream to White Marsh	C Sw	3/1/77	15-4-4
Welch Creek	From source to White Marsh	C Sw	9/1/74	15-4-5
Puncheon Branch	From source to White Marsh	C Sw	9/1/74	15-4-6
Soules Swamp (Benson Millpond)	From source to White Marsh	C Sw	9/1/74	15-4-8
Horsepen Branch	From source to Soules Swamp	C Sw	3/1/77	15-4-8-1
Peacock Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-2
Juniper Creek	From source to Soules Swamp	C Sw	9/1/74	15-4-8-3
Cedar Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-4
Fivemile Branch	From source to Cedar Branch	C Sw	9/1/74	15-4-8-4-1
Ruddy Branch	From source to Fivemile Branch	C Sw	9/1/74	15-4-8-4-1-1
Hog Branch	From source to Fivemile Branch	C Sw	9/1/74	15-4-8-4-1-2
Mire Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-5
Deep Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-6
Spring Branch	From source to Deep Branch	C Sw	9/1/74	15-4-8-6-1
Pine Log Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-7
Gray Branch	From source to Pine Log Branch	C Sw	9/1/74	15-4-8-7-1

Name of Stream	Description	Classification Class	Date	Index No.
Pine Log Branch	From source to Gray Branch	C Sw	9/1/74	15-4-8-7-1-1
Mollie Branch	From source to Soules Swamp	C Sw	9/1/74	15-4-8-8
Richardson Swamp (Richardson Millpond)	From source to White Marsh	C Sw	9/1/74	15-4-9
Camp Branch	From source to White Marsh	C Sw	9/1/74	15-4-10
Cypress Branch	From source to White Marsh	C Sw	12/1/63	15-4-11
Mill Branch	From source to Cypress Branch	C Sw	12/1/63	15-4-11-1
Cypress Creek	From source to White Marsh	C Sw	12/1/63	15-4-12
Register Branch	From source to White Marsh	C Sw	12/1/63	15-4-13
Mark Pine Canal	From source to White Marsh	C Sw	12/1/63	15-4-14
Bear Branch	From source to Waccamaw River	C Sw	12/1/63	15-5
Gum Swamp Run	From source to Waccamaw River	C Sw	12/1/63	15-6
Juniper Creek	From source to Waccamaw River	C Sw	12/1/63	15-7
Driving Creek	From source to Juniper Creek	C Sw	12/1/63	15-7-1
Muddy Branch	From source to Juniper Creek	C Sw	12/1/63	15-7-2
Little Muddy Branch	From source to Muddy Creek	C Sw	12/1/63	15-7-2-1
Bear Pen Islands Swamp	From source to Juniper Creek	C Sw	12/1/63	15-7-3
First Cross Swamp	From source to Bear Pen Islands Swamp	C Sw	12/1/63	15-7-3-1
Leonard Branch	From source to Juniper Creek	C Sw	12/1/63	15-7-4
Honey Island Swamp	From source to Juniper Creek	C Sw	12/1/63	15-7-5
Clear Branch	From source to Honey Island Swamp	C Sw	12/1/63	15-7-5-1
Camp Branch	From source to Honey Island Swamp	C Sw	12/1/63	15-7-5-2
Second Cross Swamp	From source to Honey Island Swamp	C Sw	12/1/63	15-7-5-3
Alligator Swamp	From source to Juniper Creek	C Sw	12/1/63	15-7-6
Bay Branch	From source to Alligator Swamp	C Sw	12/1/63	15-7-6-1
Bell Swamp	From source to Alligator Swamp	C Sw	12/1/63	15-7-6-2
Camp Branch	From source to Alligator Swamp	C Sw	12/1/63	15-7-6-3
Mill Branch	From source to Juniper Creek	C Sw	12/1/63	15-7-7
Ready Branch	From source to Mill Branch	C Sw	12/1/63	15-7-7-1
Horse Pen Swamp	From source to Waccamaw River	C Sw	12/1/63	15-8
Cross Swamp	From source to Waccamaw River	C Sw	12/1/63	15-9
Freeland Branch	From source to Waccamaw River	C Sw	12/1/63	15-10
Bear Branch	From source to Waccamaw River	C Sw	12/1/63	15-11
Possum Branch	From source to Waccamaw River	C Sw	12/1/63	15-12
Gore Creek (Gore Lake)	From source to Waccamaw River	C Sw	12/1/63	15-13
Simmons Bay Creek	From source to Gore Creek	C Sw	12/1/63	15-13-1
Cow Bog Branch	From source to Simmons Bay Creek	C Sw	12/1/63	15-13-1-1
Sand Pit Branch	From source to Simmons Bay Creek	C Sw	12/1/63	15-13-1-2
Ward Branch	From source to Simmons Bay Creek	C Sw	12/1/63	15-13-1-3
Wet Ash Swamp	From source to Waccamaw River	C Sw	12/1/63	15-14
Mill Branch	From source to Wet Ash Swamp	C Sw	12/1/63	15-14-1
South Prong Wet Ash Swamp	From source to Wet Ash Swamp	C Sw	12/1/63	15-14-2
Milliken Swamp	From source to Wet Ash Swamp	C Sw	12/1/63	15-14-3
Flat Branch	From source to Wet Ash Swamp	C Sw	12/1/63	15-14-4
Gore Branch	From source to Wet Ash Swamp	C Sw	12/1/63	15-14-5
Regan Branch	From source to Waccamaw River	C Sw	12/1/63	15-15
Cow Bog Branch	From source to Waccamaw River	C Sw	12/1/63	15-16
Seven Creeks (Joe Lake)	From source to Waccamaw River	C Sw	12/1/63	15-17
Grissett Swamp (Lake Tabor)	From source to dam at Lake Tabor	B Sw	12/1/63	15-17-1-(1)
Boggy Hill Branch	From source to Grissett Swamp	B Sw	12/1/63	15-17-1-2
Black Creek	From source to Lake Tabor, Grissett Swamp	B Sw	12/1/63	15-17-1-3
Simmons Branch	From source to Lake Tabor, Grissett Swamp	B Sw	12/1/63	15-17-1-4
Grissett Swamp	From dam at Lake Tabor to Seven Creeks	C Sw	9/1/74	15-17-1-(5)
Town Canal	From source to Grissett Swamp	C Sw	9/1/74	15-17-1-6
Skeebo Branch (Schewbough Branch)	From North Carolina-South Carolina State Line to Grissett Swamp	C Sw	9/1/74	15-17-1-7
Spring Branch	From source to Grissett Swamp	C Sw	9/1/74	15-17-1-8

Name of Stream	Description	Classification Class	Classification Date	Index No.
Cypress Branch	From source to Grissett Swamp	C Sw	9/1/74	15-17-1-9
Toms Fork	From North Carolina-South Carolina State Line to Grissett Swamp	C Sw	7/1/73	15-17-1-10
Ironhill Branch	From source to Toms Fork	C Sw	7/1/73	15-17-1-10-1
Juniper Swamp	From North Carolina-South Carolina State Line to Grissett Swamp	C Sw	7/1/73	15-17-1-11
Whiskey Swamp	From source to Juniper Swamp	C Sw	9/1/74	15-17-1-11-1
Monie Swamp	From source to Grissett Swamp	C Sw	12/1/63	15-17-1-12
Beaver Dam Swamp	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-1
Big Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-1
Graveyard Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-2
Sweetwater Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-3
Sellers Branch	From source to Sweetwater Branch	C Sw	12/1/63	15-17-1-12-1-3-1
Cedar Branch	From source to Sweetwater Branch	C Sw	12/1/63	15-17-1-12-1-4
Big Pond Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-5
Lebanon Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-6
Mill Branch	From source to Lebanon Branch	C Sw	12/1/63	15-17-1-12-1-6-1
Boggy Branch	From source to Beaver Dam Swamp	C Sw	12/1/63	15-17-1-12-1-7
Loggy Branch	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-2
Gum Swamp	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-3
Mill Branch Swamp	From source to Gum Swamp	C Sw	12/1/63	15-17-1-12-3-1
Williams Branch	From source to Gum Swamp	C Sw	12/1/63	15-17-1-12-3-2
Mollie Swamp	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-4
Big Branch	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-5
Maple Branch	From source to Monie Swamp	C Sw	12/1/63	15-17-1-12-6
Big Cypress Swamp	From source to Seven Creeks	C Sw	12/1/63	15-17-2
WACCAMAW RIVER	From N.C. Hwy. 904 to North Carolina-South Carolina State Line	B Sw	9/1/74	15-(18)
Bristol Creek	From source to Waccamaw River	C Sw	12/1/63	15-19
Scippio Creek	From source to Waccamaw River	C Sw	12/1/63	15-20
Marlow Branch	From source to Waccamaw River	C Sw	12/1/63	15-21
Big Creek	From source to Marlow Branch	C Sw	12/1/63	15-21-1
Stanland Branch	From source to Waccamaw River	C Sw	12/1/63	15-22
Cawcaw Swamp	From source to Waccamaw River	C Sw	12/1/63	15-23
Little Cawcaw Swamp	From source to Cawcaw Swamp	C Sw	12/1/63	15-23-1
Shingletree Swamp	From source to Cawcaw Swamp	C Sw	12/1/63	15-23-2
Persimmon Swamp	From source to Shingletree Swamp	C Sw	12/1/63	15-23-2-1
Hickmans Branch	From North Carolina-South Carolina State Line to Cawcaw Swamp	C Sw	12/1/63	15-23-3
Indigo Branch (Indian Branch)	From North Carolina-South Carolina State Line to Cawcaw Swamp	C Sw	12/1/63	15-23-4
Earnest Branch	From source to Cawcaw Swamp	C Sw	12/1/63	15-23-5
Camp Swamp	From source to North Carolina-South Carolina State Line	C Sw	12/1/63	15-24-1
Deep Branch	From source to North Carolina-South Carolina State Line	C Sw	12/1/63	15-24-2
Intracoastal Waterway	From Cape Fear River Basin at Buoy Fl R ev. 4 sec "22" to North Carolina-South Carolina State Line, including all sloughs, sounds, inlets and connecting channels	SA	12/1/63	15-25
Lockwoods Folly River	From source to mouth of Royal Oak Swamp	C Sw	12/1/63	15-25-1-(1)
Red Run	From source to Lockwoods Folly River	C Sw	12/1/63	15-25-1-2
Boggy Branch	From source to Red Run	C Sw	12/1/63	15-25-1-2-1
Pinch Gut Creek	From source to Lockwoods Folly River	C Sw	12/1/63	15-25-1-3
Holden Creek	From source to Lockwoods Folly River	C Sw	12/1/63	15-25-1-4
Ramshead Branch	From source to Lockwoods Folly River	C Sw	12/1/63	15-25-1-5
River Swamp	From source to Lockwoods Folly River	C Sw	12/1/63	15-25-1-6
Midway Branch	From source to River Swamp	C Sw	12/1/63	15-25-1-6-1
Sarah Hole	From source to River Swamp	C Sw	12/1/63	15-25-1-6-2

Ref.10

RECONNAISSANCE OF THE GROUND-WATER RESOURCES OF THE SOUTHPORT-ELIZABETHTOWN AREA, NORTH CAROLINA

NORTH CAROLINA

DEPARTMENT OF WATER RESOURCES

WALTER E. FULLER, Director

Division of Ground Water

HARRY M. PEEK, Chief

Ground-Water Bulletin Number 6

BY

REGINALD R. BLANKENSHIP

GEOLOGIST, U. S. GEOLOGICAL SURVEY

PREPARED COOPERATIVELY BY THE GEOLOGICAL SURVEY

UNITED STATES DEPARTMENT OF THE INTERIOR

1965

Ref.10

COLUMBUS COUNTY

(Area, 939 square miles; population 48,973)

Geography and Geology

Columbus County is the westernmost part of the area of study. The county is drained by the Cape Fear River, which forms its northeast border, the Lumber River, which forms its west border, and the Waccamaw River, and Juniper Creek which form part of the east border (fig. 4).

The county lies entirely within the Coastal Plain and is low and flat, the highest points being only 125 to 130 feet above sea level. Swampy areas constitute about one-fifth of the land surface and generally are less than 75 feet above sea level. Many of the swamps are subject to seasonal flooding, and few comprise permanent bodies of water. Lake Waccamaw, the largest, is 43 feet above sea level.

The Tuscaloosa Formation of Late Cretaceous age lies unconformably on crystalline rock in Columbus County. The formation contains salty water and is not developed as an aquifer. Overlying the Tuscaloosa, unconformably, is the Black Creek Formation of Late Cretaceous age. The Black Creek crops out along the Lumber River at Fair Bluff, but is covered to the south and east by strata of the Peedee Formation.

At Fair Bluff the Black Creek Formation consists of black sandy clay interbedded with sand strata. The sand ranges in grain size from very fine to very coarse and in thickness from several feet to as much as 30 feet. Deep wells at Chadbourn and Whiteville may be finished in part in the Black Creek (Brown, 1958, p. 18), but the Cretaceous deposits in Columbus County are imperfectly known, as no wells have completely penetrated the section.

The Peedee Formation crops out at the surface in a few road cuts east and north of Whiteville, and in the banks of the Cape Fear River in the northern part of the county. It also crops out at water level along the north edge of Lake Waccamaw. Green fossiliferous, indurated marl is exposed along the north edge of the Waccamaw River near where State Route 130 crosses the river. In exposures where the materials are unweathered the Peedee consists of dark-gray sandy clay and silty sand. A num-

ber of marl beds, not seen in most outcrops, are encountered in the subsurface.

A driller's log of a well at Chadbourn shows blue clay and shell to a total depth of 112 feet.

Fine to medium sand in a matrix of dark-gray clay has been logged at most intervals in the upper 120 feet of the Peedee Formation in a well at Whiteville (Brown, 1958, p. 18-19). Below the depth of 120 feet in this well several sand strata 10 feet or more in thickness were encountered to the total depth of 260 feet, the sand for the most part being very coarse to fine. In a well drilled to 675 feet at Tabor City, a total of 226 feet of sand or sand and clay, in 17 intervals ranging from 2 to 65 feet in thickness, were logged by the driller to the total depth of the hole. Only four of these intervals were logged as sand; they were from 2 to 10 feet thick and totaled 28 feet. The intervening materials were logged mainly as blue clay, rock, and shell. At Pireway, small-diameter wells have encountered dark-gray sandy clay and thin shell beds down to a depth of 200-225 feet. In the Bolton area, drillers log sand, mud, blue clay, and shell to a depth of 100 feet or more. At Acme, drillers have logged blue clay to a depth of 200 feet, below which hard rock and sand in intervals 5-15 feet thick were encountered to a total depth of 265 feet.

The Duplin Marl or a marl of younger age crops out in the banks of the Cape Fear River, and along the northern edge of Lake Waccamaw. It has been encountered also in marl pits about 3 miles north of Old Dock and in drill holes and excavations for ponds along White Marsh north of Whiteville, and along tributaries of the Waccamaw River south of Whiteville. At Acme it was formerly mined for fertilizer.

In exposures along the Cape Fear River and at Lake Waccamaw the marl is gray to tan, and partially consolidated to form a fossiliferous limestone. It is associated with beds of tan clayey sand and sandy clay. The marl, as mined north of Old Dock, is prevailingly gray and consists of shells in a matrix of gray limy sand and silt. Along Lake Waccamaw and in exposures in the Cape Fear River the marl is no thicker than 15 feet, but adjacent to White Marsh it may attain a maximum thickness of about 35 feet.

Surficial deposits consisting of sand and clay cover most of the county and attain a maximum thickness of about 35 feet. These deposits are probably of Pleistocene age. The surficial deposits are absent in some areas near Hallsboro and north and south of Whiteville.

The Cretaceous formations in Columbus County dip southward toward the coast at the rate of about 18 feet per mile. The overlying Miocene and Pleistocene deposits appear to fill erosion surfaces on the older rocks and have no determinable dip in Columbus County.

Ground Water

The most important aquifers in Columbus County are the Black Creek Formation, in the far western and northwestern parts of the county, and the Peedee Formation in the rest of the county.

The only exposures of the Black Creek Formation are near Fair Bluff in western Columbus County. Wells tapping the Black Creek in this area yield 350 gpm or more and have specific capacities of 6 to 8 gpm per foot of drawdown. The Black Creek can be expected to produce 6 to 8 gpm per foot of drawdown in most areas, maximum yields being 300-400 gpm. All wells more than 250 feet deep in the northern part of the county are mainly in the Black Creek Formation. Specific capacities of wells in this area are 8 to 10 gpm per foot of drawdown.

The Peedee Formation is only a few feet thick in the areas near Fair Bluff and along the northeastern border of the county, but it thickens to more than 250 feet in the southern part of the county.

Small flowing wells near Lake Waccamaw tap the Peedee Formation and furnish sufficient water for the needs of resort hotels and fishing camps. Wells that tap sand and shell strata of the Peedee near Bolton furnish as much as 5 gpm per foot of drawdown. At Delco, wells 150 feet deep or more furnish water containing over 800 ppm total dissolved solids, but the water is soft, total hardness being about 40 ppm. The wells for the school at Old Dock yield water containing less than 300 ppm total dissolved solids. South of Old Dock are many small flowing wells that tap the Peedee Formation.

A few small flowing wells in low areas in Columbus County are finished in the Duplin Marl or a younger marl. However, the marl is not important as an aquifer as the deposits are of limited areal extent and probably are no thicker than 15 feet in most places.

The surficial deposits cover the surface at many places in the county especially in low areas. They are a few feet to as much as 35 feet in thickness. Most wells in the formation are of small diameter (1¼-inch) and are driven, but they yield sufficient water for domestic and farm needs. Very large dug wells (ponds) are pumped for irrigation water in some places. Water levels in the surficial deposits are generally 5-10 feet below the surface.

Public Water Supplies

There are four public water-supply systems in Columbus County.

The town of Chadbourn (population 2,100) obtains its water from wells in the Peedee Formation and the Black Creek Formation (table 5, nos. 58-60). The water is pumped directly from the wells to an elevated tank (60,000-gallon). It is not treated. Pumpage is about 250,000 gpd, and there are 600 water customers.

The town of Fair Bluff (population 2,000) has two wells, both tapping the Black Creek Formation. One of the wells (table 5, no. 65) supplies most of the water, the other well (no. 64) being used only in emergencies. The water is pumped directly to an elevated tank (75,000-gallon) and is chlorinated. Pumpage is around 50,000 gpd and there are 220 water customers.

Tabor City (population 2,100) has three wells, two of which (table 5, nos. 25, 27) are in use, the third (no. 26) being abandoned. All wells tap the Peedee Formation. The water is pumped directly from the wells to an elevated tank (75,000-gallon) and is not treated. Pumpage is about 250,000 gpd for 700 water customers.

The city of Whiteville (population 5,000) is supplied with water from wells tapping the Peedee Formation and the Black Creek (see table 5, nos. 55-57). The water is pumped from the wells to a surface reservoir (100,000-gallon) and then to an

elevated tank (300,000-gallon); it is not treated. During the summer pumpage is about 1,000,000 gpd and during the remainder of the year about 300,000 gpd. There are 1,600 water customers.

Industrial and Institutional Water Supplies

At Bolton the Reigel Paper Co. supplies a shop and about 15 houses from a well (table 5, no. 44) in the Peedee Formation. The water is pumped directly to an elevated tank (50,000-gallon), and is not treated.

The town of Brunswick (population 190) is supplied with water from a privately owned well (table 5, no. 34) finished in the Peedee Formation. The water is pumped to a 1,000-gallon pressure tank for distribution to the mains. It is not treated. Pumpage is about 10,000 gpd and there are 50 customers.

West of Brunswick the Prison Camp 062 has one well (table 5, no. 33) and a 20,000-gallon elevated tank. The water is not treated.

Each rural school in the county has a well (table 5, nos. 7, 9, 10, 24, 31, 38, 40, 46, 47, 50, 51, 63, 66, 70, 73) and a pressure tank ranging in size from 500-2,500 gallons. At Old Dock School (no. 21) there are two wells flowing to an underground reservoir, from which the water is pumped to a pressure tank.

TABLE 5.--RECORDS OF WELLS IN COLUMBUS COUNTY

Well no.	Location	Owner	Type of well	Depth (ft.)	Diameter (in.)	Depth of casing (ft.)	Water-bearing material	Yield (gpm)	Remarks
1	Olyphic	M. Ray	Drilled	48	1¼		Rock		
2	Pireway	E. Sanders	do	300	1¼		Sand		Flows.
3	do	I. Long	do	189	2	189	do		
4	do	M. Long	do	210	1¼	200	do		
5	do	A. Long	do	186	3/4		do		Do.
6	Dothan	F. Phipps	do	200	2		do		Do.
7	Dulah	Guideway School	do	211	4		do	15	
8	do	E. Soles	do	61	2		do		
9	Bug Hill	Oak Forest School	do	210	4		do		Do.
10	do	Nakina School	do	179	6		do	12	
11	do	R. Gore	do	182	2		do		Do.
12	do	T. Williamson	do	175	2		do		
13	Reeves	C. Williamson	do	182	4		do		Do.
14	Reeves Ferry	P. Gore	do	200	1¼		do		Abandoned; flows; analysis.
15	Guide	Baptist Church	do	194	2		do		
16	Bethel	W. J. Long	do	155	2	135	do		
17	Nakina	W. E. Long	do	200	1¼		do		Flows.
18	do	L. Long	do	165	1¼		do		Do.
19	Ironhill	Z. Soles	do	33	2		do		
20	Mollie	E. Ward	do	135	2		do		
21	Old Dock	Old Dock School	do	115	1¼		do		Do; analysis.
22	Crusoe Island	D. Cumbee	do	150	1¼		do		
23	Old Dock	H. Reynolds	do	210	2		do		Flows.
24	Tabor City	Douglas School	do	90	4		do		
25	do	Tabor City	do	675	8		do	70	Analysis.
26	do	do	do	340	8		do	500	Do.
27	do	do	do	337	8		do	400	Do.
28	Cherry Grove	N. Lovett	do	175	2		do		
29	do	O. Wiepson	do	85	2		do		
30	Wards	R. Ward	do	45	1¼		do		
31	Sidney	Williams School	do	179	2½		do	18	
32	Harrelsonville	O. Ray	do	52	1½		Shell bed		
33	Brunswick	Prison Camp 062	do	147	6		Sand	20	

TABLE 5.--RECORDS OF WELLS IN COLUMBUS COUNTY - Continued

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TABLE 5.--RECORDS OF WELLS IN COLUMBUS COUNTY - Continued

TABLE 5.--RECORDS OF WELLS IN COLUMBUS COUNTY - Continued

Well no.	Location	Owner	Type of well	Depth (ft.)	Diameter (in.)	Depth of casing (ft.)	Water-bearing material	Yield (gpm)	Remarks
34	Brunswick-------	E. Vinson and R. Gasken---------	Drilled--	365	6	----------	Sand----------	--------	Analysis.
35	-------do-------	New England Spinning Co.---	---do----	200	8	----------	-------do------	700	
36	N. of Old Dock--	H. Stallings-----	---do----	120	2	----------	-------do------	--------	
37	N. of Acme------	Riegel Paper Co.-	---do----	265	8	----------	-------do------	90	Abandoned.
38	Armour----------	Armour School----	---do----	256	4	----------	-------do------	22	
39	Delco----------	R. Kennedy-------	---do----	152	1¼	----------	-------do------	--------	Abandoned; analysis.
40	-------do-------	Delco School-----	---do----	276	4	----------	-------do------	15	
41	Freeman---------	Baptist Church---	---do----	150	1¼	----------	-------do------	--------	
42	-------do-------	Hufham's Texaco Service--------	---do----	155	1¼	----------	-------do------	--------	
43	Bolton----------	Brunswick County-	---do----	250	8	----------	-------do------	--------	Abandoned.
44	-------do-------	Riegel Paper Co.-	---do----	160	8	----------	-------do------	165	
45	-------do-------	J. Wilson--------	---do----	165	4	----------	-------do------	--------	Analysis.
46	N. of Bolton----	Waccamaw School--	---do----	112	4	----------	-------do------	--------	
47	Bolton----------	Bolton School----	---do----	160	4	----------	-------do------	18	
48	Lake Waccamaw---	Jones Hotel------	---do----	115	2	----------	Rock----------	--------	Flows.
49	-------do-------	Bluestar Fishing Co.----------	---do----	100	2	----------	-------do------	--------	Do.
50	Hallsboro-------	Artesia School---	---do----	163	6	----------	Sand----------	--------	
51	-------do-------	Hallsboro School-	---do----	130	4	----------	-------do------	20	
52	-------do-------	Ritter Lumber Co.	---do----	90	6	----------	-------do------	--------	Analysis.
53	-------do-------	-------do--------	---do----	125	6	----------	-------do------	--------	
54	White Marsh-----	C. Moss----------	---do----	150	2	----------	-------do------	--------	
55	Whiteville------	Whiteville-------	---do----	290	8	----------	-------do------	300	Do.
56	-------do-------	-------do--------	---do----	285	8	----------	-------do------	300	Do.
57	-------do-------	-------do--------	---do----	313	8	----------	-------do------	350	
58	Chadbourn-------	Chadnourn--------	---do----	166	16	----------	-------do------	--------	11/9/59.
59	-------do-------	-------do--------	---do----	90	6	----------	-------do------	--------	Analysis.
60	-------do-------	-------do--------	---do----	90	8	----------	-------do------	--------	Do.
61	-------do-------	Chadbourn Textiles, Inc.----	---do----	112	6	----------	-------do------	--------	

Ref. 10

TABLE 5.--RECORDS OF WELLS IN COLUMBUS COUNTY - Continued

Well no.	Location	Owner	Type of well	Depth (ft.)	Diameter (in.)	Depth of casing (ft.)	Water-bearing material	Yield (gpm)	Remarks
62	Cerro Gordo-----	E. Williamson----	Drilled--	166	1½	----------	Sand----------	--------	
63	-------do-------	Cerro Gordo School---------	---do----	140	4	----------	-------do------	25	
64	Fair Bluff------	Fair Bluff-------	---do----	175	6	----------	-------do------	--------	Analysis.
65	-------do-------	-------do--------	---do----	165	6	----------	-------do------	350	Do.
66	-------do-------	Carver-Moore School---------	---do----	289	4	----------	-------do------	20	
67	-------do-------	J. Fields--------	---do----	75	2	----------	-------do------	--------	
68	Williamson Cross road----------	C. Judson--------	---do----	18	1½	----------	-------do------	--------	
69	Evergreen-------	R. Kissam--------	---do----	87	2	----------	-------do------	--------	
70	-------do-------	Evergreen School-	---do----	121	4	----------	-------do------	25	
71	Oak Grove-------	C. Sibbett-------	---do----	97	2	----------	-------do------	--------	
72	N of Chadbourn--	Baptist Church---	---do----	100	2	----------	-------do------	--------	
73	N of Whiteville-	Mount Olive School---------	---do----	98	4	----------	-------do------	10	
74	-------do-------	W. Robinson------	---do----	85	2	----------	-------do------	--------	
75	-------do-------	Pervines Grocery-	---do----	90	1½	----------	-------do------	--------	
76	-------do-------	O. Batten--------	---do----	35	2	----------	Shell bed------	--------	
77	N of Hallsboro--	L. Batten--------	---do----	112	2	----------	Sand----------	--------	
78	N of Lake Waccamaw------	E. Young---------	---do----	87	1½	----------	-------do------	--------	

Table 6 - Chemical Analyses of Water from Wells, Columbus County

(Numbers at heads of columns correspond to well numbers in table 5.)

Parts per million

Ref. 10

Table 6 - Chemical Analyses of Water from Wells, Columbus County

(Numbers at heads of columns correspond to well numbers in table 5.)

Parts per million

Table 6 - Chemical Analyses of Water from Wells, Columbus County

(Numbers at heads of columns correspond to well numbers in table 5.)

Parts per million

	14	21	25	26	27	34	39	45
Silica (SiO_2)	12	12	14	19	18	38	6.3	8.9
Iron (Fe), total	1/.03	.02	.22	.14	.26	.13	.12	.09
Iron (Fe) in solution								
Calcium (Ca)	6.4	3.8	1.6	7.2	6.8	32	8.6	5.6
Magnesium (Mg)	4.4	1.9	.7	4.4	1.9	12	4.7	2.8
Sodium and potassium (Na+K)	Na 528	Na 106 K 5.5	136	103	104	21	Na 290 K 15	Na 44 K 6.1
Bicarbonate (HCO_3)	604	300	303	304	261	198	477	155
Carbonate (CO_3)								
Sulfate (SO_4)	32	2.0	2.5	.6	1.9	3.6	10	.3
Chloride (Cl)	486	4.0	18	4.8	7.0	5.2	210	2.5
Fluoride (F)	2.3	1.5	.9	.6	1.0	1.1	1.2	1.1
Nitrate (NO_3)	.0	1.0	.4	1.4	.6	.3	1.4	.1
Dissolved solids	1420	289	338	300	288	203	807	145
Hardness as $CaCO_3$	2/34	18	7	36	25	129	41	26
pH	8.2	8.3	8.4	7.95	8.45	7.6	8.0	8.3
Water-bearing material		Sand	Sand	Sand	Sand	Sand	Sand	Sand
Date of collection		1/12/56	11/22/48	11/19/48	9/22/48	6/8/48	8/25/54	1/12/56

Analyzed by the Quality of Water Branch, U. S. Geological Survey

Ref. 10

Table 6 - Chemical Analyses of Water from Wells, Columbus County - Continued

(Numbers at heads of columns correspond to well numbers in table 5.)

Parts per million

	52	55	56	59	60	64	65
Silica (SiO_2)	23	37	44	38	33	55	49
Iron (Fe), total		.06	.09	.38	4.8	2.0	.25
Iron (Fe) in solution							
Calcium (Ca)		28	19	53	41	.5	10
Magnesium (Mg)		8.7	5.1	3.8	4.2	.4	1.7
Sodium and potassium (Na+K)		34	73	10	6.2	52	31
Bicarbonate (HCO_3)	157	205	242	173	152	111	110
Carbonate (CO_3)							
Sulfate (SO_4)	.5	1.8	1.7	2.3	2.8	3.0	1.4
Chloride (Cl)	3.0	6.8	2.2	18	4.0	13	4.5
Fluoride (F)		.1	.0	.1	.0	.9	.2
Nitrate (NO_3)	.8	.1	.6	.1	.0	.2	.5
Dissolved solids		211	280	215	166	186	152
Hardness as $CaCO_3$	111	106	66	152	120	30	32
pH	7.5	7.8	8.2	7.5	7.5	7.4	7.2
Water-bearing material	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Date of collection	1/12/56	1/8/48	1/8/48	1/22/48	1/22/48	5/20/48	5/20/48

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References Cited

Brown, P. M., 1958, Well logs from the coastal plain of North Carolina: North Carolina Dept. Conserv. and Devel. Bull. 72, 68 p., 8 pls., 9 figs., 1 table.

Clark, W. B., Miller, B. L., Stephenson, L. W., Johnson, B. L., and Parker, H. N., 1912, The coastal plain of North Carolina: Raleigh, North Carolina Geol. and Econ. Survey, v. 3, 552 p.

LeGrand, H. E., and Brown, P. M., 1955, Guidebook of excursion in the coastal plain of North Carolina, October 8-9, 1955: Carolina Geol. Soc., 43 p.

Stephenson, L. W., 1923, The Cretaceous formations of North Carolina: North Carolina Geol. Survey Bull. 5, pt. 1, 604 p.

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NORTH CAROLINA ATLAS

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Edited by JAMES W. CLAY
DOUGLAS M. ORR, JR.
ALFRED W. STUART

Foreword by JAMES E. HOLSHOUSER, JR.

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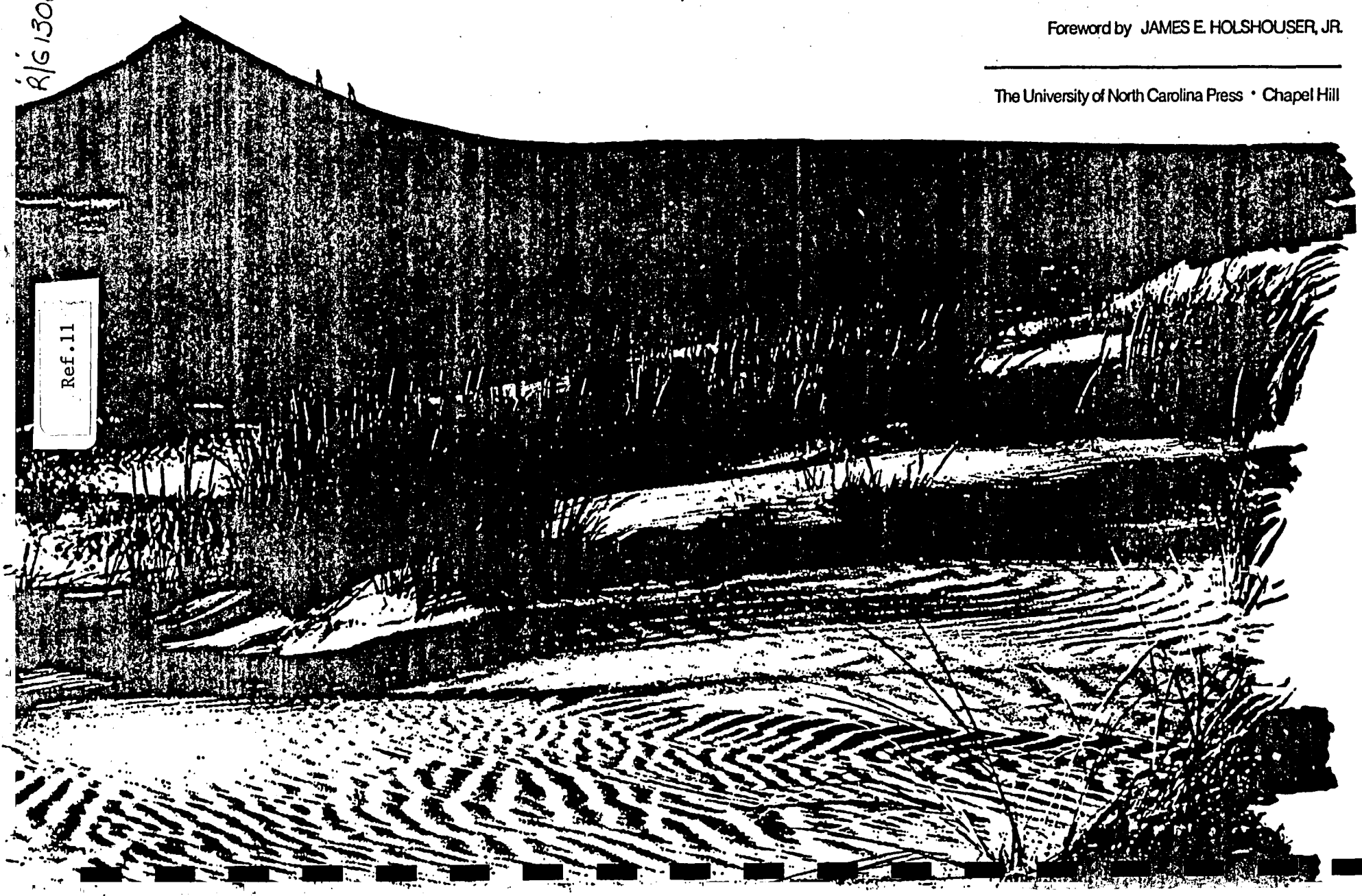

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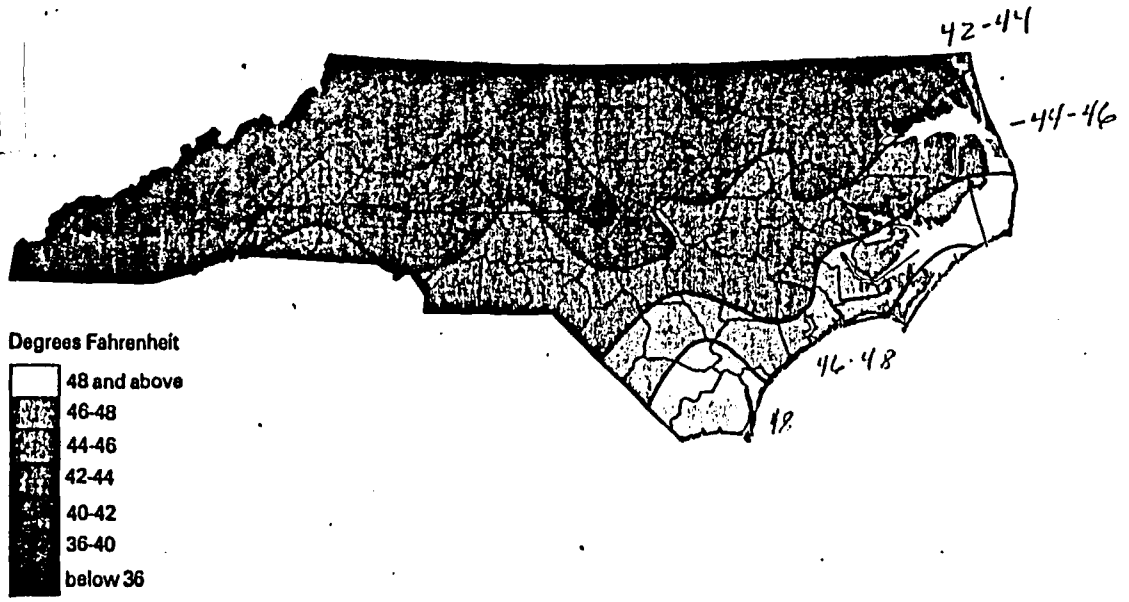
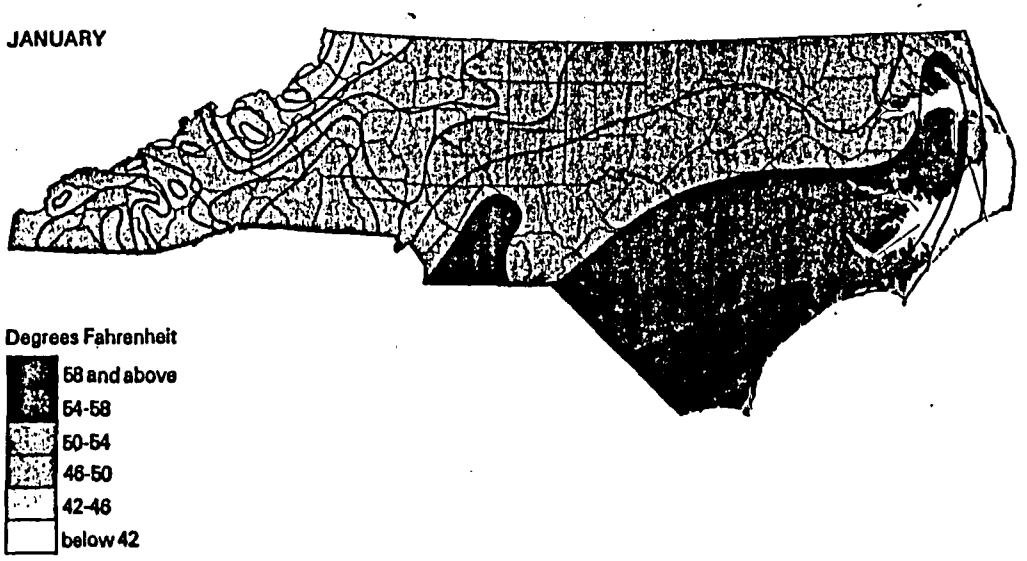
Figure 5.2. Average January Temperatures in N.C.



Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

Figure 5.3. Mean Maximum Temperature in N.C.



Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

Seasonal Changes in Climate

Winter The alternate passage of low- and high-pressure systems over the state during winter months results in changing weather conditions. Moisture and warmer temperatures are characteristically associated with frequently passing low-pressure cells. Lows are followed by polar highs, which bring lower temperatures and clear skies. However, even when under the influence of these polar highs, temperatures seldom fall below 10° F., and midday temperatures reach into the forties, making the winter season very tolerable by northern standards.

January average temperatures shown in Figure 5.2 illustrate the mildness of winters. Only at the highest elevations do temperatures average below freezing. The mean temperature for January at Mount Mitchell is 28.7° F., the lowest in the state. Yet, at Asheville, located on the lee side of the mountains, temperatures for January average 39.4° F.

Nowhere else in North Carolina is the local contrast in temperatures as great as in the western counties. Temperature contrasts are least where the climate is mildest. Hatteras, on the Outer Banks, has a January mean of 48.0° F., and only thirteen days each year when temperatures of 32° F. and below are recorded.

The tendency for January isotherms to parallel the coast shows the influence of the Atlantic Ocean. Wilmington, in southeastern North Carolina, the most subtropical area in the state, exemplifies the maritime effect. This coastal city has a January mean temperature of 47.8° F., and an average of only eight days during January when temperatures dip to 32° F. or less, as compared with eighteen days at Raleigh and nineteen at Asheville.

In the Piedmont, latitude is the primary control on temperature, and the isotherms maintain a zonal pattern. As might be expected, temperature averages lie between those exhibited by the surrounding regions. Charlotte has a mean January temperature of 42.3° F., Greensboro, 39.0° F., and Raleigh, 42.7° F.

However, whereas Asheville averages eighty-three days each year when temperatures drop below freezing, Winston-Salem has freezing temperatures eighty-eight days annually, and Greensboro has eighty-four days with freezing temperatures.

When high-pressure systems (anticyclones) dominate, clear to partly cloudy weather prevails. Receiving, on the average, 50 to 60 percent of total possible sunshine, North Carolina receives more hours of winter sunshine than do states to the north and to the immediate west. Sunshine is more prevalent in the southeast around Wilmington, and diminishes rapidly as the Mountains are approached. The Mountains receive about one-third less sunshine than does the rest of North Carolina.

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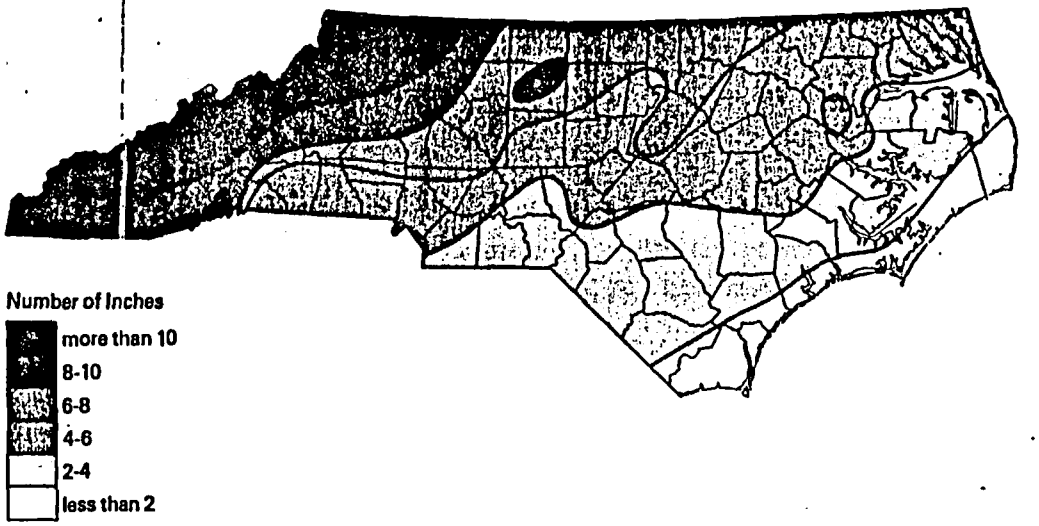
Spring For many North Carolinians, this season is the most preferable of all. With the northward shifting of the noon sun, the storm track normal to North Carolina during the winter retreats northward and fewer and fewer cyclonic storms occur. Cold spells are less numerous and periods of high temperatures and balmy days become longer and more pronounced. Rainfall diminishes slightly in April, but increases toward the summer as cyclonic activity gives way to thundershowers and their heavy downpours. Although more precipitation is received in the state during May and June, there are fewer hours and days in which rainfall occurs, indicating a higher precipitation intensity.

Mean temperatures range from the fifties in April to the seventies in June for all places save those at high elevations. The days are marked by cool nights and warm afternoons with relative humidities at optimal levels for human comfort. As the daylight period lengthens, sunshine percentages and totals increase to their highest values for the year. For the eastern two-thirds of the state, sunshine during April, May, and June is received approximately 70 percent of the time and in amounts exceeding three hundred hours for the latter part of the season.

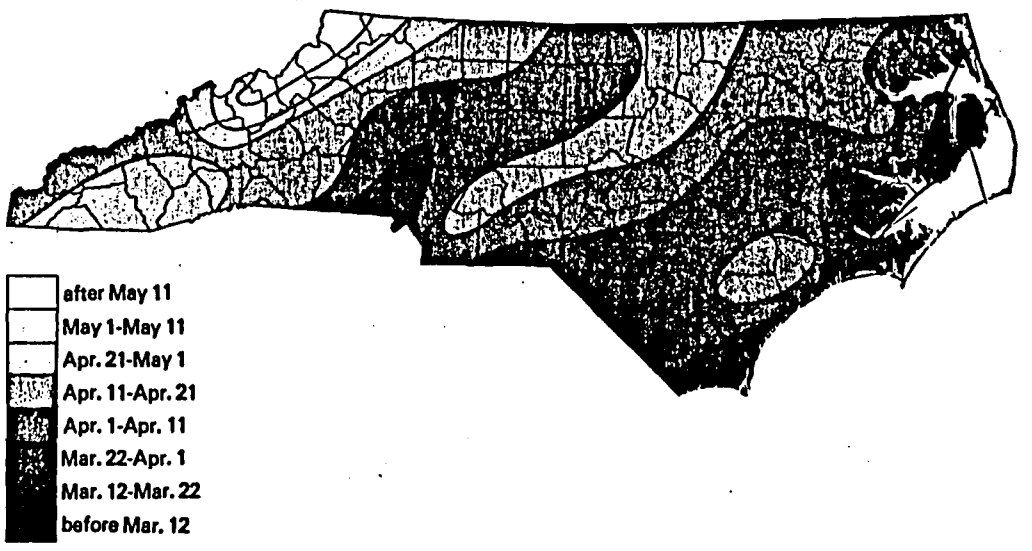
Average Date of the Last Freeze in Spring As illustrated by Figure 5.8, the beginning of the freeze-free season varies across the state from 1 March to 10 May, a difference in time of over two months. As expected, the milder climate along North Carolina's coast engenders early dates, whereas the more severe climate of the Mountains retards the start of the freeze-free period longer than elsewhere. In most areas of the Coastal Plain, the last spring freeze generally occurs by the first of April. The Piedmont has its last freezes between 1 and 10 April, about ten to fifteen days later than the Coastal Plain. In the Mountains, there is greater variation in mean dates for both the beginning and the end of the freeze season. Because air chills more quickly at higher elevations, and because cold air is denser than warm air, the cold air drains into the valleys where it is contained and continues to lose heat by radiation. The result of this process is that in certain Mountain areas some valleys are more often colder than their slopes at intermediate altitudes. Lying between the below-freezing temperatures of the valleys and the higher elevations are "verdant" or "thermal" belts.

Figure 5.7. Average Annual Snowfall in N.C.



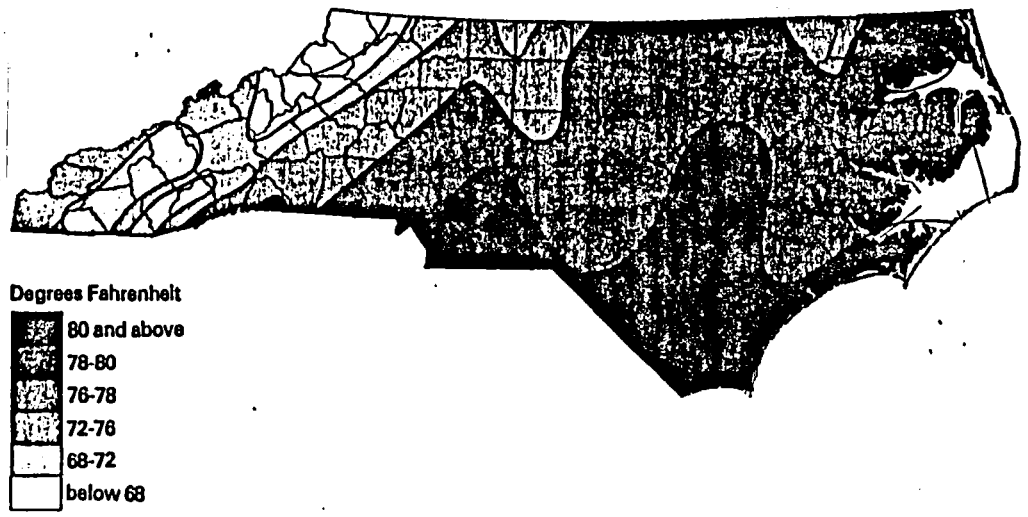
Source: U.S. Department of Commerce, *Climatological Summary*, 1966.

Figure 5.8. Average Date of Last Freezing Temperature in N.C.



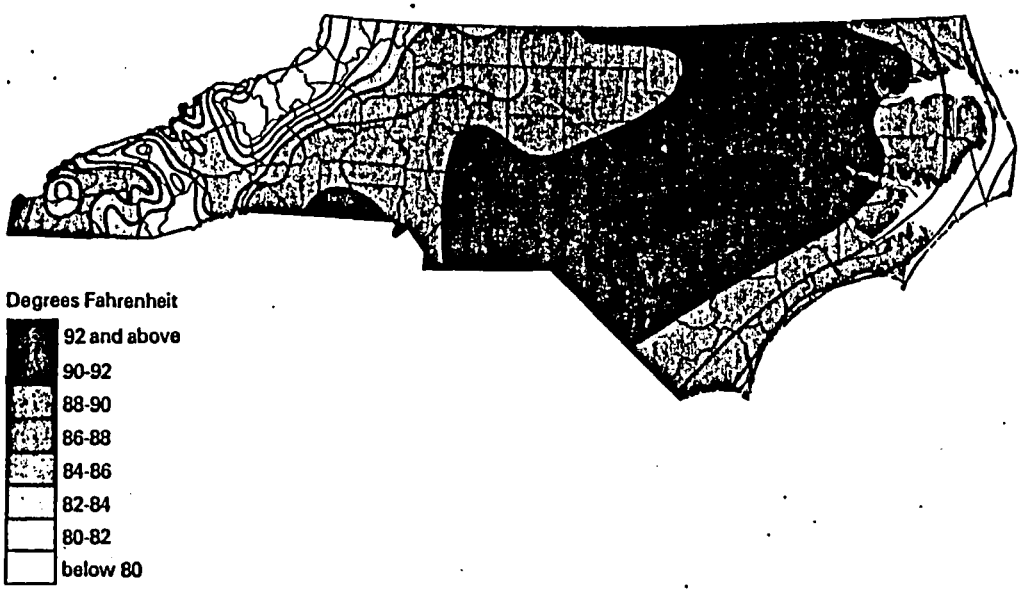
Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

Figure 5.9. Average July Temperature in N.C.



Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

Figure 5.10. Mean Maximum July Temperature in N.C.



Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

These strip-like regions have longer freeze-free seasons and thereby show earlier dates for the end of the freeze period than their surroundings. They support frost-susceptible vegetation long after the greenery has disappeared in nearby areas. Often in early winter or even in midwinter a contrasting belt of green flanked above and below by brown may be seen. These green belts are characteristically located along slopes that face the winter sun, are protected from cold northern winds, and have cold air drainage to lower valleys. The blossoming of dogwood and redbud moves across the state in a pattern similar to that of the end of the freeze season to blanket North Carolina with color and beauty.

Summer Summer is characterized by its high temperatures, high humidities, high amounts of rainfall, and high physiological stress. Except for the amelioration of these climatic elements in the Mountains, and the relief afforded by sea breezes along the coast, elsewhere in the state summer is a season of extremes. Mean monthly minimum temperatures for July and August are in the upper seventies and eighties and mean maximum temperatures reach into the nineties.

However, to quote a popular adage, "it's not the heat but the humidity," and North Carolina's temperatures in combination with the high water vapor amounts prevalent during the summer months are definitely uncomfortable. In addition, high sunshine percentages and a predominance of southerly winds tend to aggravate an already unpleasant climatic condition. Only the periodic passage of cool, dry air masses from the north and sea breezes in the coastal areas alleviate the discomfort of summer weather for North Carolina's low-lying counties.

July Average Temperatures The pattern of mean temperatures in July is similar to the pattern in January (Figure 5.9). However, in the Piedmont and Coastal Plain, isotherms are fewer in number and farther apart. In the Mountains, the reverse is true. The widespread isotherms east of the Mountains indicate that temperature averages across central and eastern North Carolina exhibit little contrast. From the western Piedmont to the coast, the difference in mean temperatures is only 4° F. Although the influence of the ocean is not evident in the arrangement of isotherms, the high temperatures of the Coastal Plain are made less severe by the cooling power of the sea breeze. Hatteras, on the Outer Banks, records a temperature of 90° F. on the average of only one day each year, while Wilmington, a short distance from the coast, has an occurrence of 90° F. temperatures about twenty-four days annually. In contrast with these locations, Raleigh and Winston-Salem mean temperatures for July are slightly lower, but the average number of days on which a temperature of 90° F. or above is experienced increases to more than forty

Autumn is the driest season of the year and rainfall amounts drop below 3 inches throughout central and eastern North Carolina during October and November. Cyclonic activity increases as thunderstorms become less frequent until by late November they seldom occur.

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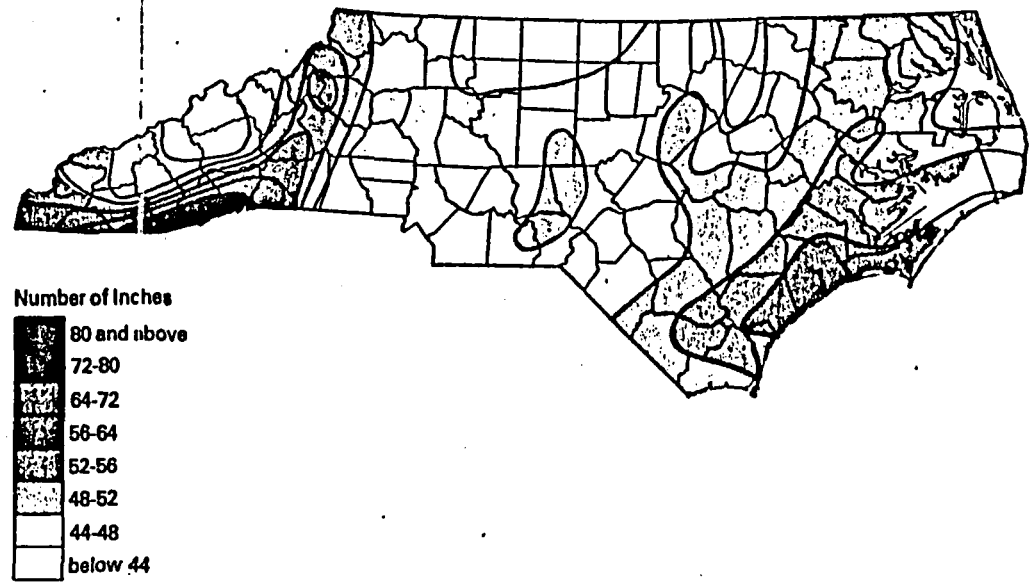
As illustrated in Figure 5.14, freezes begin early in October in the Mountains and slowly move eastward toward the coast. In early December, the freeze-free season reluctantly comes to a close in the Wilmington-Southport area. Deciduous trees begin their dormancy period and the color of the state gradually changes from the quiet greens of summer to the fiery reds and brilliant yellows of fall. By late autumn the highlands, now a mottled brown and green, show an occasional sprinkling of white as temperatures in the Mountains fall below freezing and the possibility of snow increases. However, in the Piedmont and Coastal Plain, tennis, sailing, and picnicking, for example, continue into November and football games played late in the season are often attended by fans dressed in warm-season attire.

Figure 5.15. Average Annual Precipitation in N.C.



Source: U.S. Department of Commerce, *Weather and Climate in North Carolina*, 1972.

Annual Precipitation and Humidity

Although a considerable variation in the distribution of rainfall exists throughout the state, everywhere precipitation is high (Figure 5.15). In the Coastal Plain, rainfall totals average from 44 to 55 inches; the highest amounts were received at the Outer Banks. Across the Piedmont, yearly rainfall averages range from 43 to 48 inches, with the northern and southern sectors having the lower totals. The greatest variability in rainfall distribution is found in the Mountains. Here, south-facing slopes along the North Carolina-South Carolina border receive as much as 80 inches of precipitation each year. Nearby, Asheville, lying in a sheltered valley, records only 37 inches, the lowest rainfall average reported in the state. More commonly, average annual precipitation in the Mountains ranges from 44 to 58 inches. For the state as a whole, an average total of 50 inches is representative.

The distribution of rainfall throughout the year is reasonably uniform. Although there are no pronounced wet and dry seasons, a profile of average annual precipitation indicates a bimodal distribution, i.e., two periods of higher rainfall separated by two periods during the year when rainfall amounts are lower than the norm. Generally, the highest precipitation totals are associated with the summer months. In the fall, the season of the least rainfall, the lowest yearly totals usually occur in October or November. Precipitation increases slightly during the winter season and then decreases to a secondary low in April. This precipitation regime is common to the state and varies only slightly from place to place.

Although rainfall is heaviest in the summer, evaporation and transpiration losses are also great. Consequently, the summer season is deficient in its supply of soil moisture and irrigation may be required to sustain crop needs.

Although it is considered to be a wet state, North Carolina nevertheless has its occasional "bout with drought." Recently, the Piedmont and Inner Coastal Plain suffered through an especially severe drought. In 1968, negative rainfall departures amounting to as much as 26 inches were computed by individual stations within this area. On the other hand, 1972 proved to be an abnormally wet year. During that year, Raleigh, which has an average annual precipitation of 46.35 inches, experienced a total rainfall of 51.74 inches. Raleigh's weather records may be used to illustrate the variations in yearly precipitation amounts. In the capital city, annual totals have varied from a low of 30 inches in 1933 to a high of 64 inches in 1936. On a monthly basis, rainfall variation for July has ranged from 12.36 inches in 1931 to as little as 0.38 inches in 1953. Yet precipitation variability in North Carolina is moderate compared with those states where rainfall totals are significantly less and consequently precipitation patterns and regimes are more unpredictable.

Average Number of Days with 0.01 Inches of Precipitation or More Figure 5.16 shows the pattern of days with measurable precipitation in North Carolina. The Mountains have the greatest number of days with measurable precipitation, averaging 10 to 20 more rainy days per year than the coast and 20 to 30 days more than the southern Piedmont. In the northwest corner of the state precipitation occurs 4 out of every 10 days. By contrast, the sandhills in the Southern Piedmont experiences precipitation on only 30 percent of the days. In fact, a "tongue" of fewer rainy days penetrates the state from south to north, through North Carolina's central counties. For the state as a whole, 125 days with measurable precipitation is a representative figure.

Water Balance

The "wetness" or "dryness" of any region is mirrored by its natural vegetation. Indigenous plant life is an indicator of a region's precipitation effectiveness and its capacity to support plant growth. The minimal moisture requirements of plant communities are quite specific, and in situ vegetation reflects the amounts of water annually and seasonally available for its use. As the size of a bank account depends upon the balance between deposits and withdrawals, so precipitation effectiveness

a er.

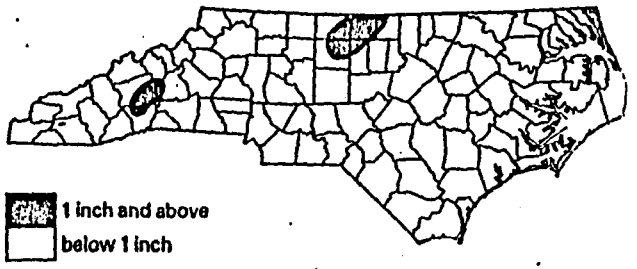
Figure 5.18 provides the water balance *deficits* for the state and shows that everywhere except for the Asheville area and the northern Piedmont, the annual water deficit is less than one inch. By contrast, Figure 5.19 gives water balance surpluses. Being a wet state, North Carolina's water budget indicates surpluses exceeding deficits by large amounts. While most of the Piedmont and Coastal Plain have surplus water up to 15 inches, the Outer Banks and the Mountains show *surpluses* above 15 inches. In the southwest corner of the state, water surpluses amount to as much as 30 inches.

Mean annual evaporation for North Carolina is shown in Figure 5.20. Evaporation rates and totals are related to temperature, wind velocity, and relative humidity. Where temperatures are highest and humidities lowest, evaporation intensities will be greatest. Since temperatures throughout the Coastal Plain and the Piedmont are highest for the state and since humidity percentages are greater in the vicinity of the ocean, evaporation totals are lower in the Mountains and along the coast, and highest in the southern Piedmont and Coastal Plain. A comparison of the maps showing precipitation, evaporation, water surplus, and water deficit will provide the reader with a fairly complete picture of North Carolina's water balance.

Winds and Storms

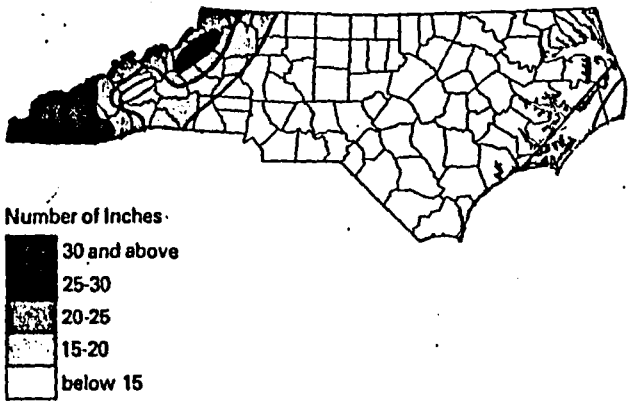
Three types of storms and their associated winds are common to North Carolina: cyclonic and convectional thunderstorms, hurricanes, and tornadoes. These storms are integral parts of the state's climatic pattern. In analyzing the importance of winds, direction and speed are major considerations.

Although prevailing winds (winds that persist in blowing from one direction *more so* than any other) characterize given geographical areas, wind direction changes frequently. A northwesterly wind (coming from the northwest) will be, relatively speaking, a cooling and drying wind, whereas a southeasterly wind will bring warm, moist air to the state. The passage of cyclones and anticyclones with their characteristic wind patterns will change the wind's direction so that it may come across North Carolina from any point of the compass.

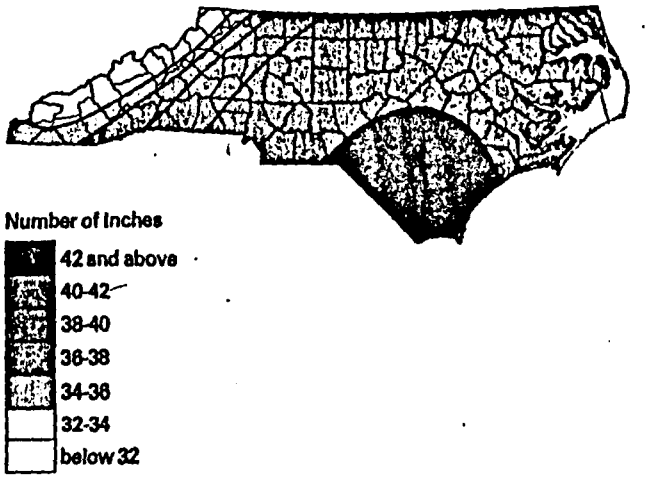


Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

Figure 5.19. Water Balance Surplus in N.C.



Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

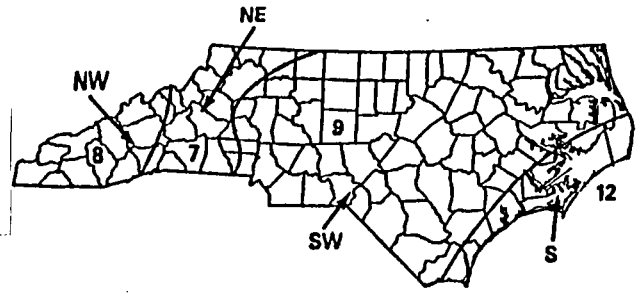


Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

The velocity of the wind is relevant to ventilation of air pollutants, evaporation rates, and thus cooling and chilling indexes. On those occasions when winds reach gale force and higher, their velocities are of singular importance because of their destructive capabilities. Damaging winds are usually associated with infrequent hurricanes and tornadoes and, at times, with severe thunderstorms.

The prevailing winds and mean wind speeds averaged for the year are given in Figure 5.21. For the eastern two-thirds of the state, winds blow most frequently from the southwest and south. Throughout the Mountains and the western Piedmont, winds prevail from northerly directions. This annual pattern of prevailing winds persists for most months of the year except September and October when winds are dominantly from the northeast. During these months, the clockwise flow of air from seasonal anticyclones lying poleward of North Carolina, and the counterclockwise winds associated with an increased number of offshore storms cause northeasterlies to prevail across the state.

Figure 5.21. Prevailing Winds and Mean Annual Wind Speed in N.C.



Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

Note: Wind speeds are noted in miles per hour.

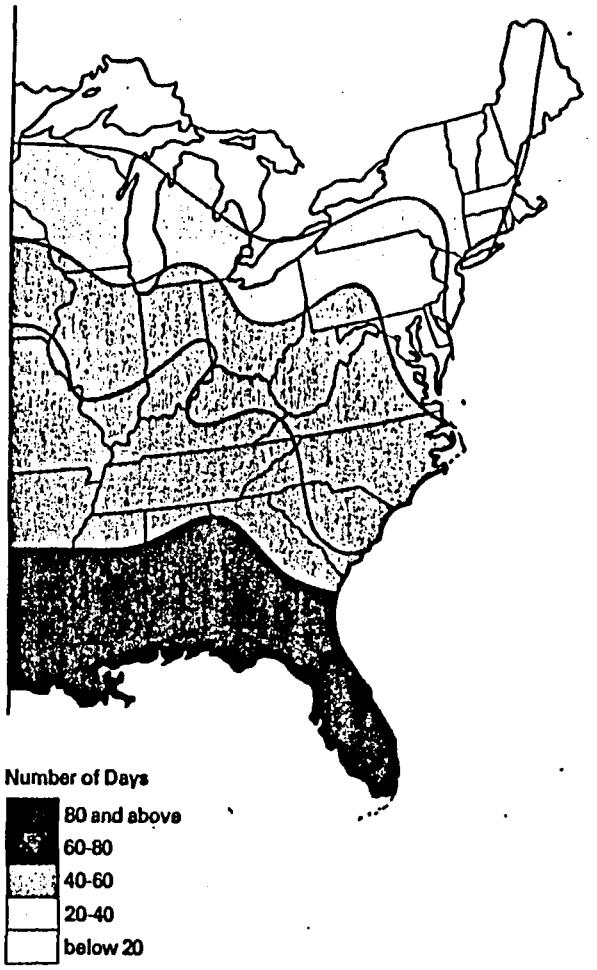
Wind speeds have been averaged for each zone of prevailing winds. Winds tend to diminish in speed westward from the coast where sea breezes and offshore storms contribute to velocities that average twelve miles per hour. Throughout the Inner Coastal Plain and the Piedmont, the mean wind speed is nine miles per hour, and in the western counties, representative wind speeds are seven and eight miles per hour. On a daily basis, wind velocities are lowest before dawn and highest around midafternoon. Seasonally, winter, with greater temperature and pressure contrasts, shows the most rapid air movement and summer is the time of lowest wind speeds.

Thunderstorms Thunderstorms are vertically developed storm systems that involve lightning and thunder. Produced by instability in the atmosphere, these storms are sustained by the conversion of water vapor into rain and hail, which causes the release of enormous amounts of energy. This energy results in vigorous updrafts of rapidly moving air. The intensity and turbulence of an individual thunderstorm is related to the degree of atmospheric instability and the supply of latent energy released by the condensing of water vapor. In structure, the typical thunderstorm is a collection of convective cells each averaging a mile or more in diameter. A cell is comprised of columns of rapidly rising air separated and counterbalanced by downdrafts of slower moving air. Associated with thunderstorms and their bulbous facade are heavy downpours of rain, hail, gusty and squally winds, and of course, lightning and thunder.

Because thunderstorm development and frequency is enhanced by (1) atmospheric instability that is linked to high surface temperatures, (2) atmospheric moisture that supplies the latent energy requirements, and (3) some triggering device to start the convection process, thunderstorms occur more frequently in regions of warm temperatures and high humidities. North Carolina's climate is conducive to thunderstorm development and the state experiences violent local storms forty to fifty days each year. For the United States, Florida and the Gulf Coast lead in the number of days with thunderstorms. Here, seventy to ninety days per year with thunderstorms is normal. In the northern states and along the West Coast, thunderstorm activity drops off because of colder temperatures over land and coastal waters. North Carolina's pattern of thunderstorm activity shows fewest storms off the northeast coast where coastal waters also are cooler. Inland, thunderstorms are more frequent, increasing to fifty days as the Mountains are approached. In the Mountains, the higher frequency of storm activity (all types) and the triggering supplied by mountain and frontal slopes results in the most thunderous area to be found in the state (Figure 5.22).

Hurricanes In the latter half of the year, the United States is visited by hurricanes. Originating over tropical oceans as small cyclones, under favorable conditions hurricanes become large, intense storm systems. Their winds exceed seventy-five miles per hour and spiral counterclockwise around an "eye" of very low pressure. Sustained by the ocean that breeds them, these storms are driven by the heat released from condensing water vapor. Covering tens of thousands of square miles, hurricanes move slowly and deliberately, at speeds between fifteen and fifty miles per hour, delivering prodigious amounts of precipitation to areas over which they pass. Moving out of the tropics, hurricanes of the Atlantic Ocean generally invade the Gulf of Mexico, or veer northward toward the middle latitudes, occasionally penetrating the continent, or skirting the coastline as far north as New England. Hurricanes are sea monsters and diminish in intensity as they move inland and away from their source of energy. Although capable of great destruction, hurricanes nevertheless benefit the southeastern states to a substantial degree. As the eastern states are subject to periodic summer droughts, the vast amounts of water delivered to this region by these giant tropical storms have served more than once to alleviate or terminate the disastrous effects of drought conditions. However, hurricanes are killer storms, and their long-range benefits are obscured by the more obvious death, destruction, and damage accompanying them. On the average, the Atlantic Ocean generates six hurricanes a

Figure 5.22. Average Number of Days with Thunderstorms



Source: Glenn T. Trewartha, Arthur H. Robinson, and Edwin H. Hammond, eds., *Elements of Geography*, 5th ed. (New York: McGraw-Hill Book Co., 1967).

year, but as many as eleven in one year have been observed. North Carolina has experienced twelve especially disastrous hurricanes since 1900. Cape Hatteras, extending as it does into the ocean, is affected by hurricanes more than any other area of North Carolina (Figure 5.23). Its low-lying sandy surface is especially vulnerable to the combined effects of high winds, high tides, and flooding associated with these storms.

Ref. 11

Reference 12

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

Kris W. Barrett
S. Steven Chang
Stuart A. Haus
Andrew M. Platt

August 1982

MTR-82W111

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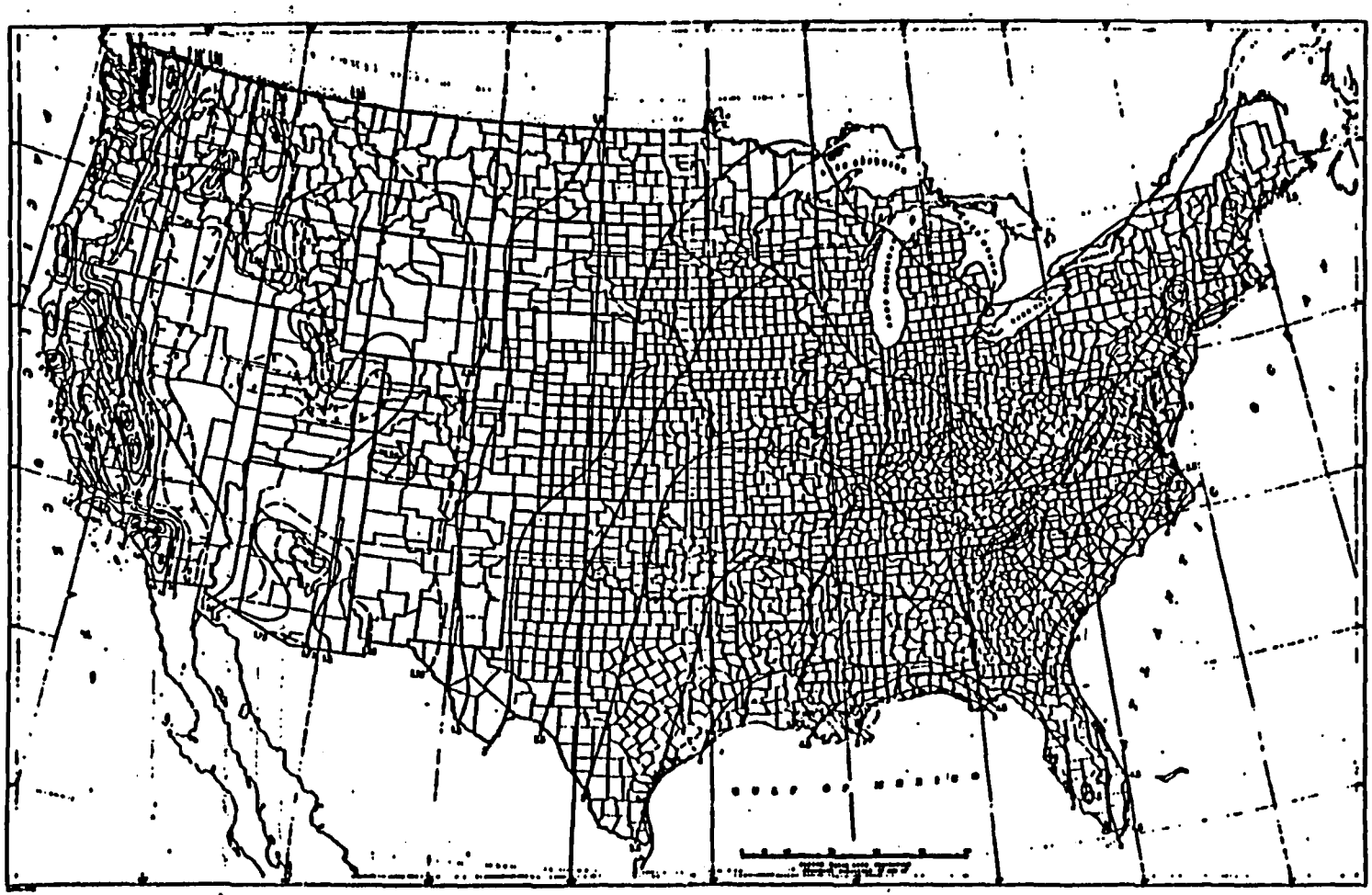

Source: Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., 1961.

FIGURE 8
1-YEAR 24-HOUR RAINFALL
(INCHES)

1 year 24-hour rainfall = 3"

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Statistical Abstract

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Table 178

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EMISSIONS INVENTORY SUMMARY (IN TONS)
FROM POINT AND AREA SOURCES, BY COUNTY
1979

County	Particulates		Sulfur Dioxide		Nitrogen Oxides		Volatile Organic Compounds and Hydrocarbons		Carbon Monoxide	
	Area Sources	Point Sources	Area Sources	Point Sources	Area Sources	Point Sources	Area Sources	Point Sources	Area Sources	Point Sources
State Total	553,662	222,263	43,247	731,157	334,896	290,035	560,734	114,695	2,416,683	130,670
Alamance	7,718	868	818	1,428	5,890	266	11,748	3	45,688	21
Alexander	2,150	633	173	128	1,150	32	1,634	535	6,880	2
Alleghany	2,168	-	63	-	611	-	924	-	3,931	-
Anson	2,537	201	183	2	1,618	16	2,700	92	10,909	4
Ashe	5,022	422	127	9	1,127	74	1,713	231	7,535	12
Avery	1,785	78	89	83	799	50	797	8	4,116	7
Beaufort	5,334	1,079	307	21,236	2,731	1,145	4,277	23	19,654	51
Bertie	2,927	1,688	144	316	1,598	312	2,107	63	11,434	101
Bladen	3,565	135	191	551	1,935	99	2,731	184	12,777	8
Brunswick	3,293	913	284	16,616	2,818	3,418	3,285	29,359	16,967	10,845
Buncombe	15,826	4,523	1,036	101,654	8,073	34,108	17,219	536	66,409	2,245
Burke	5,906	368	485	1,528	4,066	671	6,335	1,486	27,445	109
Cabarrus	6,136	765	581	2,638	4,775	1,126	8,704	998	45,995	94
Caldwell	6,070	3,850	581	383	3,408	435	4,897	5,680	19,740	69
Camden	707	3	47	-	517	-	825	-	4,021	-
Carteret	1,949	8	270	81	2,269	16	5,080	-	20,446	2
Caswell	2,438	899	124	-	1,160	-	1,516	-	8,438	-
Catawba	7,537	19,814	1,345	75,338	7,829	33,880	13,934	3,016	40,662	1,932
Chatham	4,994	9,679	349	12,208	2,464	5,352	3,999	756	15,675	889
Cherokee	3,332	50	104	1	1,050	6	1,750	1	7,010	1
Chowan	747	54	93	326	795	54	1,405	227	6,347	4
Clay	2,096	-	71	-	1,200	-	2,076	-	17,224	-
Cleveland	6,160	365	945	406	4,030	929	6,461	-	15,717	46
Columbus	5,840	1,406	351	7,735	3,216	2,082	4,170	412	20,162	12,427
Craven	6,501	3,358	399	6,706	3,677	2,614	6,682	1,048	32,514	7,089
Cumberland	17,810	586	1,120	2,927	9,493	681	17,624	834	90,631	74
Currituck	1,100	159	700	-	1,200	2	1,400	-	4,900	-
Dare	605	5	104	240	932	71	3,926	2	14,035	12
Davidson	10,207	355	756	998	6,301	629	10,328	2,470	44,355	144
Davie	2,233	428	149	66	1,259	31	5,206	181	8,938	5
Duplin	4,789	105	273	763	2,949	154	3,668	41	18,942	13
Durham	10,624	836	778	880	6,398	194	12,903	703	58,610	15
Edgecombe	3,302	3,041	491	407	4,010	81	4,720	1,367	21,017	17
Forsyth	17,838	528	2,173	5,837	16,754	2,152	24,192	21,488	95,712	186
Franklin	2,850	-	181	-	1,771	-	3,165	83	13,286	-
Gaston	10,171	7,966	1,145	62,730	8,842	29,610	15,598	687	61,159	1,789
Gates	1,298	-	69	-	729	-	740	-	4,277	-
Graham	842	44	35	60	354	19	479	3	2,231	4
Granville	5,457	78	206	720	2,277	1,028	4,013	515	19,515	188
Greene	1,329	11	87	-	998	-	1,330	-	7,063	-
Guilford	33,493	2,702	2,769	3,330	20,142	989	31,063	14,057	139,198	495
Halifax	5,044	1,306	315	9,556	2,903	2,485	5,316	329	25,552	10,410
Harnett	5,575	143	306	765	3,268	169	4,489	5	24,530	14
Haywood	4,414	682	285	9,768	2,528	4,703	5,531	49	17,166	43,964
Henderson	6,842	308	370	2	3,040	28	5,703	3	21,248	7
Hertford	2,085	885	152	276	1,410	2,615	2,278	54	11,197	111
Hoke	897	31	122	193	979	54	1,834	-	6,977	3
Hyde	828	148	95	-	814	-	3,074	-	11,064	-
Iredell	10,157	2,169	729	916	4,958	665	9,541	1,025	37,946	114
Jackson	4,694	99	153	5	2,007	30	3,203	6	18,948	6
Johnston	7,755	1,671	429	138	4,069	31	5,726	718	24,989	3
Jones	995	-	70	-	862	-	962	-	5,573	-
Lee	1,936	81	329	75	2,459	25	4,465	274	15,602	314
Lenoir	32,597	451	368	2,979	2,828	1,094	4,523	15	22,470	282
Lincoln	2,892	116	275	714	2,126	173	3,292	167	11,732	13
McDowell	2,645	185	179	1,042	1,690	392	2,698	230	12,728	44
Macon	3,282	16	263	-	2,016	-	3,091	-	16,300	-
Madison	3,444	1	160	14	1,165	7	1,442	2	7,027	2
Martin	3,523	3,738	93	18,647	863	7,719	1,039	1,093	5,528	12,789
Mecklenburg	20,607	3,335	3,503	3,631	24,745	813	35,601	5,707	156,662	1,758
Mitchell	1,591	124	106	52	780	13	745	520	4,161	1
Montgomery	1,949	365	190	35	1,465	31	3,339	13	9,172	23
Moore	4,418	97	265	71	2,464	45	4,295	60	18,219	9
Nash	5,322	559	594	1,203	4,373	323	8,567	309	35,371	30
New Hanover	4,042	4,675	1,080	35,483	5,411	13,157	10,379	8,344	40,872	855
Northampton	2,193	232	144	627	1,607	280	1,999	150	10,632	43
Onslow	6,007	39	485	48	4,326	10	7,447	-	35,360	-
Orange	6,169	90	335	1,194	2,929	615	4,846	57	28,470	31
Pamlico	995	-	91	-	773	-	1,635	-	6,356	-
Pasquotank	1,508	432	166	140	1,238	211	2,436	38	11,882	40
Pender	2,248	-	130	-	1,628	-	2,232	-	12,482	-
Perquimans	1,004	21	76	-	755	-	1,065	-	5,249	-
Person	4,221	15,859	195	73,710	1,533	34,504	2,968	593	11,446	1,923
Pitt	8,053	390	423	1,580	3,970	312	6,656	30	37,356	26
Polk	1,917	37	82	34	703	56	970	-	4,441	1
Randolph	11,786	83	627	64	3,543	31	9,203	377	27,791	-
Richmond	2,983	21	485	38	2,663	8	4,786	-	17,374	80
Robeson	9,120	452	621	6,434	5,365	2,634	8,985	631	41,534	154
Rockingham	10,052	34,193	586	7,270	4,726	3,390	8,993	251	36,548	199
Rowan	7,590	3,548	698	10,791	5,126	4,909	9,062	139	39,959	272
Rutherford	6,778	2,994	331	37,872	2,930	14,013	4,912	382	21,356	787
Sampson	5,988	101	345	705	3,321	136	4,839	95	23,036	11
Scotland	1,780	272	171	585	1,663	191	3,385	2,458	12,465	22
Stanly	3,915	1,288	321	2,307	2,745	385	3,764	130	17,428	11,436
Stokes	4,908	38,172	186	145,468	1,627	63,072	2,138	1,052	10,278	3,504
Surry	8,047	1,285	521	1,413	3,908	445	6,333	154	23,729	66
Swain	988	182	53	-	532	-	838	-	3,290	-
Transylvania	2,181	31	116	807	935	201	1,968	3	6,691	12
Tyrrell	674	3	70	-	627	-	1,139	-	4,752	-
Union	6,003	896	534	182	4,126	72	6,294	784	23,997	7
Vance	2,452	267	280	66	2,193	33	3,913	50	16,660	1
Wake	25,540	214	1,839	265	16,875	119	26,854	891	144,690	699
Warren	2,761	-	108	-	1,183	-	1,584	-	8,294	-
Washington	1,494	930	622	26	1,387	173	2,501	35	7,466	35
Watauga	4,143	47	176	585	1,509	140	2,268	33	11,054	9
Wayne	6,682	29,890	564	21,769	5,475	6,828	9,922	144	37,706	1,619
Wilkes	9,765	1,081	415	1,074	3,589	327	3,732	189	17,403	41
Wilson	4,374	202	539	86	4,449	18	8,416	16	30,203	1
Yadkin	3,292	10	189	18	1,718	4	2,171	-	11,255	1
Yancey	1,831	13	95	102	771	19	1,023	-	5,368	2

SOURCE: North Carolina Department of Natural Resources and Community Development, Division of Environmental Management.

Table 16

POPULATION DENSITY AND LAND AREA BY COUNTY
1960, 1970 AND 1980

Ref.13

County	Density[a] 1960	Density[a] 1970	Density[a] 1980	1980 Land Area (Sq. Mi.)
State Total	93	104	120	48,843
Alamance	197	226	229	433
Alexander	61	75	97	259
Alleghany	34	36	41	234
Anson	47	44	48	533
Ashe	46	46	52	426
Avery	49	52	58	247
Beaufort	43	44	49	826
Bertie	35	29	30	701
Bladen	33	30	35	879
Brunswick	23	28	42	861
Buncombe	202	221	244	659
Burke	104	118	144	505
Cabarrus	189	206	236	364
Caldwell	104	121	144	471
Camden	23	23	24	241
Carteret	52	59	78	525
Caswell	46	45	49	427
Catawba	180	231	266	396
Chatham	38	42	47	708
Cherokee	36	36	42	452
Chowan	65	62	69	181
Clay	26	25	31	214
Cleveland	142	155	178	468
Columbus	52	50	54	939
Craven	81	89	101	702
Cumberland	225	324	376	657
Currituck	24	28	43	256
Dare	15	18	34	391
Davidson	146	174	207	548
Davie	63	71	92	267
Duplin	49	47	50	819
Durham	375	450	513	298
Edgecombe	106	103	111	506
Forsyth	447	513	592	412
Franklin	58	55	61	494
Gaston	355	417	455	357
Gates	27	25	26	338
Graham	22	22	25	289
Granville	61	61	64	534
Greene	62	56	61	266
Guilford	379	441	487	651
Halifax	82	73	76	724
Harnett	80	82	99	601
Haywood	73	76	84	555
Henderson	95	113	156	375
Hertford	64	69	66	356
Hoke	50	42	52	391
Hyde	9	9	9	624
Iredell	106	126	144	574
Jackson	36	44	53	490
Johnston	79	77	89	795
Jones	24	21	21	470
Lee	104	119	142	259
Lenoir	141	138	149	402
Lincoln	94	110	142	298
McDowell	61	70	80	437
Macon	29	31	39	517
Madison	38	36	37	451
Martin	56	54	56	461
Mecklenburg	502	669	766	528
Mitchell	63	63	65	222
Montgomery	38	39	46	490
Moore	48	55	72	701
Nash	111	109	124	540
New Hanover	370	449	559	185
Northampton	50	43	42	538
Onslow	114	135	148	763
Orange	108	144	193	400
Pamlico	29	28	31	341
Pasquotank	112	118	125	228
Pender	22	21	25	875
Perquimans	35	34	39	246
Person	66	65	73	398
Pitt	107	113	137	656
Polk	49	49	55	238
Randolph	77	96	116	789
Richmond	82	84	95	477
Robeson	94	89	107	949
Rockingham	122	127	147	569
Rowan	160	172	191	519
Rutherford	80	84	95	568
Sampson	50	48	53	947
Scotland	79	84	101	319
Stanly	102	108	123	396
Stokes	49	52	73	452
Surry	90	96	110	539
Swain	16	17	20	526
Transylvania	43	52	62	378
Tyrrell	11	10	10	407
Union	70	86	110	639
Vance	129	131	148	249
Wake	196	267	353	854
Warren	44	37	38	427
Washington	40	41	45	332
Watauga	55	74	101	314
Wayne	148	153	175	554
Wilkes	59	65	78	752
Wilson	155	153	169	374
Yadkin	68	73	85	336
Yancey	45	40	48	314

(a) Population per square mile of land area. Land area calculations for 1960 and 1970 differ slightly from those for 1980.

SOURCE: U.S. Department of Commerce, Bureau of the Census.
Office of State Budget and Management, Research and Planning Services.

Table 17

NORTH CAROLINA POPULATION OF INCORPORATED PLACES AND THEIR PERCENTAGE GROWTH
1970 TO 1980

City	County Location	1970 Census	1980 Census	Percentage Change
Aberdeen	Moore	1,592	1,945	22.2%
Ahoskie	Hertford	5,105	4,887	-4.3
Alamance	Alamance	NA	320	NA
Albemarle	Stanly	11,126	15,110	35.8
Alexander Mills	Rutherford	988	643	-34.9
Alliance	Pamlico	577	616	6.8
Andrews	Cherokee	1,384	1,621	17.1
Angier	Harnett	1,431	1,709	19.4
Ansonville	Anson	694	794	14.4
Apex	Wake	2,234	2,847	27.4
Arapahoe	Pamlico	212	467	120.3
Archdale	Guilford, Randolph	4,874	5,745	17.9
Arlington	Yadkin	711	872	22.6
Asheboro	Randolph	10,797	15,252	41.3
Asheville	Buncombe	57,929	53,583	-7.5
Askewville	Bertie	247	227	-8.1
Atkinson	Pender	325	298	-8.3
Atlantic	Carteret	NA	NA	NA
Atlantic Beach	Carteret	300	941	213.7
Aulander	Bertie	947	1,214	28.2
Aurora	Beaufort	620	698	12.6
Autryville	Sampson	213	228	35.2
Ayden	Pitt	3,450	4,361	26.4
Bailey	Nash	724	685	-5.4
Bakersville	Mitchell	409	373	-8.8
Banner Elk	Avery	754	1,087	44.2
Bath	Beaufort	231	207	-10.4
Battleboro	Edgecombe, Nash	562	632	12.5
Bayboro	Pamlico	665	759	14.1
Bear Grass	Martin	99	82	-17.2
Beaufort	Carteret	3,368	3,826	13.6
Belhaven	Beaufort	2,259	2,430	7.6
Belmont	Gaston	5,054	4,607	-8.8
Belville	Brunswick	59	102	72.9
Belwood	Cleveland	736	613	-16.7
Benson	Johnson	2,267	2,792	23.2
Bessemer City	Gaston	4,991	4,787	-4.1
Bethel	Pitt	1,514	1,825	20.5
Beulaville	Duplin	1,156	1,060	-8.3
Biltmore Forest	Buncombe	1,298	1,499	15.5
Biscoe	Montgomery	1,244	1,334	7.2
Black Creek	Wilson	449	523	16.5
Black Mountain	Buncombe	3,204	4,083	27.4
Bladenboro	Bladen	783	1,428	82.4
Blowing Rock	Caldwell, Watauga	801	1,337	66.9
Boiling Spring Lakes	Brunswick	245	998	307.8
Boiling Springs	Cleveland	2,284	2,381	4.2
Bolivia	Brunswick	185	252	36.2
Bolton	Columbus	534	563	5.4
Boone	Watauga	8,754	10,191	16.4
Boonville	Yadkin	687	1,028	49.6
Bostic	Rutherford	289	476	64.7
Brevard	Transylvania	5,243	5,323	1.5
Bridgeton	Craven	520	461	-11.3
Broadway	Lee	694	908	30.8
Brookford	Catawba	590	467	-20.8
Brunswick	Columbus	206	223	8.3
Bryson City	Swain	1,290	1,556	20.6
Bunn	Franklin	284	505	77.8
Burgaw	Pender	1,744	1,586	-9.1
Edenton	Chowan	4,956	5,357	8.1
Elizabeth City	Camden, Pasquotank	14,381	14,004	-2.6
Elizabethtown	Bladen	1,418	3,551	150.4
Elk Park	Avery	503	535	6.4
Elkin	Surry, Wilkes	2,899	2,858	-1.4
Ellenboro	Rutherford	465	560	20.4
Ellerbe	Richmond	913	1,415	55.0
Elm City	Wilson	1,201	1,561	30.0
Elon College	Alamance	2,150	2,873	33.6
Emerald Isle	Carteret	122	865	609.0
Enfield	Halifax	3,272	2,995	-8.5
Erwin	Harnett	2,852	2,828	-0.8
Eureka	Wayne	263	303	15.2
Everetts	Martin	198	213	7.6
Fair Bluff	Columbus	1,039	1,095	5.4
Fairmont	Robeson	2,827	2,658	-6.0
Faison	Duplin	598	636	6.4
Faith	Rowan	506	552	9.1
Falcon	Cumberland, Sampson	357	339	-5.0
Falkland	Pitt	130	118	-9.2
Fallston	Cleveland	301	614	104.0
Farmville	Pitt	4,424	4,707	6.4
Fayetteville	Cumberland	53,510	59,507	11.2
Forest City	Rutherford	7,179	7,688	7.1
Fountain	Pitt	434	424	-2.3
Four Oaks	Johnston	1,057	1,049	-0.8
Foxfire	Moore	9	153	1,600.0
Franklin	Macon	2,336	2,640	13.0
Franklinton	Franklin	1,459	1,394	-4.5
Franklinville	Randolph	794	607	-23.6
Fremont	Wayne	1,596	1,736	8.8
Fuquay-Varina	Wake	3,576	3,110	-13.0
Garland	Sampson	656	885	34.9
Garner	Wake	4,923	10,073	104.6
Garysburg	Northampton	231	1,434	520.8
Gaston	Northampton	1,105	883	-20.1
Gastonia	Gaston	47,322	47,333	0.0
Gatesville	Gates	338	363	7.4
Germanton	Stokes	NA	NA	NA
Gibson	Scotland	502	533	6.2
Gibsonville	Alamance, Guilford	2,019	2,865	41.9
Glen Alpine	Burke	797	645	-19.1
Godwin	Cumberland	129	233	80.6
Gold Point	Martin	108	NA	NA
Goldsboro	Wayne	26,960	31,871	18.2
Goldston	Chatham	364	353	-3.0
Graham	Alamance	8,172	8,674	6.1
Grainger	Lenoir	NA	NA	NA
Granite Falls	Caldwell	2,388	2,580	8.0
Granite Quarry	Rowan	1,344	1,294	-3.7
Greenevers	Duplin	424	477	12.5
Greensboro	Guilford	144,076	155,642	8.0
Greenville	Pitt	29,063	35,740	23.0
Grifton	Lenoir, Pitt	1,860	2,179	17.2
Grimesland	Pitt	394	453	15.0
Grover	Cleveland	555	597	7.6
Halifax	Halifax	335	253	-24.5
Hamilton	Martin	579	638	10.2
Hamlet	Richmond	4,627	4,720	2.0
Harmony	Iredell	377	470	24.7

Ref. 13

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Burnsville	Yancey	1,348	1,452	7.7
Calabash	Brunswick	154	128	-16.9
Calypso	Duplin	462	689	49.1
Cameron	Moore	204	225	10.3
Candor	Montgomery	561	868	54.7
Canton	Haywood	5,158	4,631	-10.2
Cape Carteret	Carteret	616	944	53.2
Carolina Beach	New Hanover	1,663	2,000	20.3
Carrboro	Orange	5,058	7,336	45.0
Carthage	Moore	1,034	925	-10.5
Cary	Wake	7,686	21,763	183.2
Casar	Cleveland	339	346	2.1
Cashiers	Jackson	230	553	140.4
Castalia	Nash	265	358	35.1
Caswell Beach	Brunswick	28	110	292.9
Catawba	Catawba	565	509	-9.9
Centerville	Franklin	123	135	9.8
Cerro Gordo	Columbus	322	295	-8.4
Chadbourn	Columbus	2,213	1,975	-10.8
Chadwick Acres	Onslow	12	15	25.0
Chapel Hill	Durham, Orange	26,199	32,421	23.7
Charlotte	Mecklenburg	241,420	314,447	30.2
Cherryville	Gaston	5,258	4,844	-7.9
China Grove	Rowan	1,788	2,081	16.4
Chocowinity	Beaufort	566	644	13.8
Claremont	Catawba	788	880	11.7
Clarkton	Bladen	662	664	0.3
Clayton	Johnston	3,103	4,091	31.8
Cleveland	Rowan	614	595	-3.1
Clinton	Sampson	7,157	7,552	5.5
Clyde	Haywood	814	1,008	23.8
Coakley	Edgecombe	NA	NA	NA
Coats	Harnett	1,051	1,385	31.8
Cofield	Hertford	318	465	46.2
Colerain	Bertie	373	284	-23.9
Columbia	Tyrrell	902	758	-16.0
Columbus	Polk	731	727	-0.5
Como	Hertford	211	89	-57.8
Concord	Cabarrus	18,464	16,942	-8.2
Conetoe	Edgecombe	160	215	34.4
Conover	Catawba	3,355	4,245	26.5
Conway	Northampton	694	678	-2.3
Cornelius	Mecklenburg	1,296	1,460	12.7
Cove City	Craven	485	500	3.1
Cramerton	Gaston	2,142	1,869	-12.7
Creedmoor	Granville	1,405	1,641	16.8
Creswell	Washington	633	426	-32.7
Crossnore	Avery	264	297	12.5
Dallas	Gaston	4,059	3,340	-17.7
Danbury	Stokes	152	140	-7.9
Davidson	Iredell, Mecklenburg	2,931	3,241	10.6
Delview	Gaston	11	7	-36.4
Denton	Davidson	1,017	949	-6.7
Dillsboro	Jackson	215	179	-16.7
Dobson	Surry	933	1,222	31.0
Dorches	Nash	686	885	29.0
Dover	Craven	585	600	2.6
Drexel	Burke	1,431	1,392	-2.7
Dublin	Bladen	283	477	68.6
Dudley	Wayne	199	NA	NA
Dundarrach	Hoke	53	NA	NA
Dunn	Harnett	8,302	8,962	7.9%
Durham	Durham	95,438	100,831	5.7
Earl	Cleveland	195	206	5.6
East Arcadia	Bladen	556	461	-17.1
East Bend	Yadkin	485	602	24.1
East Laurinburg	Scotland	487	536	10.1
East Spencer	Rowan	2,217	2,150	-3.0
Eden	Rockingham	15,871	15,672	-1.3

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Herrellsville	Hertford	165	151	-8.[redacted]
Herrisburg	Cabarrus	1,098	1,433	30.5
Hassell	Martin	160	109	-31.9
Havelock	Craven	3,012	17,718	488.2
Haw River	Alamance	1,944	1,858	-4.4
Hayesville	Clay	428	376	-12.1
Haywood	Chatham	NA	190	NA
Hazelwood	Haywood	2,057	1,811	-12.0
Henderson	Vance	13,896	13,522	-2.7
Hendersonville	Henderson	6,443	6,862	6.5
Hertford	Perquimans	2,023	1,941	-4.1
Hickory	Burke, Catawba	20,569	20,757	0.9
High Point	(a)	63,229	63,380	0.2
High Shoals	Gaston, Lincoln	563	586	4.1
Highlands	Macon	583	653	12.0
Hildebran	Burke	521	628	20.5
Hillsborough	Orange	1,444	3,019	109.1
Hobgood	Halifax	530	483	-8.9
Hoffman	Richmond	434	389	-10.4
Holden Beach	Brunswick	136	232	70.6
Holly Springs	Wake	697	688	-1.3
Holly Ridge	Onslow	415	465	12.0
Hollyville	Pamlico	NA	100	NA
Hookerton	Greene	441	460	4.3
Hope Mills	Cumberland	1,866	5,412	190.0
Hot Springs	Madison	653	678	3.8
Hudson	Caldwell	2,820	2,888	2.4
Huntersville	Mecklenburg	1,538	1,294	-15.9
Indian Beach	Carteret	245	54	-78.0
Indian Trail	Union	405	811	100.2
Jackson	Northampton	762	720	-5.5
Jackson Springs	Moore	NA	NA	NA
Jacksonville	Onslow	16,289	17,056	4.7
Jamestown	Guilford	1,297	2,148	65.6
Jamesville	Martin	533	604	13.3
Jason	Greene	NA	NA	NA
Jefferson	Ashe	943	1,086	15.2
Jonesville	Yadkin	1,659	1,752	5.6
Jupiter	Buncombe	208	NA	NA
Kelford	Bertie	295	254	-13.9
Kenansville	Duplin	762	931	22.2
Kenly	Johnston, Wilson	1,370	1,433	4.6
Kernersville	Forsyth	4,815	6,802	41.3
Kill Devil Hills	Dare	357	1,796	403.1
Kings Mountain	Cleveland, Gaston	8,465	9,080	7.3
Kinston	Lenoir	23,020	25,234	9.6
Kittrell	Vance	427	225	-47.3
Knightdale	Wake	815	985	20.9
Kure Beach	New Hanover	394	611	55.1
LaGrange	Lenoir	2,679	3,147	17.5%
Lake Lure	Rutherford	456	488	7.0
Lake Waccamaw	Columbus	924	1,133	22.6
Landis	Rowan	2,297	2,092	-8.9
Lansing	Ashe	283	194	-31.4
Lasker	Northampton	114	96	-15.8
Lattimore	Cleveland	257	237	-7.8
Laurel Park	Henderson	581	764	31.5
Laurinburg	Scotland	8,859	11,480	29.6
Lawndale	Cleveland	544	469	-13.8
Lawrence	Edgecombe	NA	NA	NA
Leggett	Edgecombe	120	99	-17.5
Lenoir	Caldwell	14,705	13,748	-6.5
Lewiston	Bertie	327	459	40.4
Lexington	Davidson	17,205	15,711	-8.7
Liberty	Randolph	2,167	1,997	-7.8
Lilesville	Anson	641	588	-8.3
Lillington	Harnett	1,155	1,948	68.7
Lincolnton	Lincoln	5,293	4,879	-7.8
Linden	Cumberland	205	365	78.0

Ref. 13

City	County Location	1970 Census	1980 Census	Percentage Change
Linville	Avery	NA	244	NA
Littleton	Halifax	903	820	-9.2
Locust	Stanly	1,484	1,590	7.1
Long Beach	Brunswick	493	1,844	274.0
Long View	Burke, Catawba	3,360	3,587	6.8
Louisburg	Franklin	2,941	3,238	10.1
Love Valley	Iredell	40	55	37.5
Lowell	Gaston	3,307	2,917	-11.8
Lucama	Wilson	610	1,070	75.4
Lumber Bridge	Robeson	117	171	46.2
Lumberton	Robeson	16,961	18,241	7.5
McAdenville	Gaston	950	947	-0.3
McDonald	Robeson	80	117	46.3
McFarlan	Anson	140	133	-5.0
Macclesfield	Edgecombe	536	504	-6.0
Macon	Warren	179	153	-14.5
Madison	Rockingham	2,018	2,806	39.0
Maggie Valley	Haywood	159	202	27.0
Magnolia	Duplin	614	592	-3.6
Maiden	Catawba, Lincoln	2,416	2,574	6.5
Manteo	Dare	547	902	64.9
Marietta	Robeson	70	NA	NA
Marion	McDowell	3,335	3,684	10.5
Mars Hill	Madison	1,623	2,126	31.0
Marshall	Madison	982	809	-17.6
Marshville	Union	1,405	2,011	43.1
Matthews	Mecklenburg	783	1,648	110.5
Maury	Greene	421	NA	NA
Maxton	Robeson, Scotland	1,885	2,711	43.8
Mayodan	Rockingham	2,875	2,627	-8.6
Maysville	Jones	912	877	-3.8
Mebane	Alamance, Orange	2,573	2,782	8.1
Mesic	Pamlico	369	390	5.7
Micro	Johnston	300	438	46.0
Middleburg	Vance	149	185	24.2
Middlesex	Nash	729	837	14.8
Mildred	Edgecombe	NA	NA	NA
Milton	Caswell	235	235	0.0
Minnesott Beach	Pamlico	41	171	317.1
Mint Hill	Mecklenburg	2,262	7,915	249.9
Mocksville	Davie	2,529	2,637	4.3
Monroe	Union	11,282	12,639	12.0
Montreat	Buncombe	581	741	27.5
Mooresboro	Cleveland	453	405	-8.6
Mooresville	Iredell	8,808	8,575	-2.6
Morehead City	Carteret	5,233	4,359	-16.7
Morganton	Burke	13,625	13,763	1.0
Morrisville	Wake	209	251	20.1
Morven	Anson	562	765	36.1
Mount Airy	Surry	7,325	6,862	-6.3
Mount Gilead	Montgomery	1,286	1,423	10.7
Mount Holly	Gaston	5,107	4,530	-11.3
Mount Olive	Duplin, Wayne	4,914	4,876	-0.8
Mount Pleasant	Cabarrus	1,174	1,210	3.1
Murfreesboro	Hertford	4,418	3,007	-31.9
Murphy	Cherokee	2,082	2,070	-0.6
Nags Head	Dare	414	1,020	146.4
Nashville	Nash	1,670	2,678	60.4
Navassa	Brunswick	487	439	-9.9
New Bern	Craven	14,660	14,557	-0.7
Rockwell	Rowan	999	1,339	34.0
Rocky Mount	Edgecombe, Nash	34,284	41,283	20.4
Rolesville	Wake	533	381	-28.5
Ronda	Wilkes	465	457	-1.7
Roper	Washington	649	795	22.5
Rose Hill	Duplin	1,448	1,508	4.1
Roseboro	Sampson	1,235	1,227	-0.6
Rosman	Transylvania	407	512	25.8
Rowland	Robeson	1,358	1,841	35.6
Roxboro	Person	5,370	7,532	-86.4
Roxobel	Bertie	347	278	-19.9
Rural Hall	Forsyth	1,289	1,336	3.6
Ruth	Rutherford	360	381	5.8
Rutherford College	Burke	821	1,108	35.0
Rutherfordton	Rutherford	3,245	3,434	5.8
Salemburg	Sampson	669	742	10.9
Salisbury	Rowan	22,515	22,677	0.7
Saluda	Polk	546	607	11.2
Sanford	Lee	11,716	14,773	26.1
Saratoga	Wilson	391	381	-2.6
Scotland Neck	Halifax	2,869	2,834	-1.2
Seaboard	Northampton	611	687	12.4
Seagrove	Randolph	354	294	-16.9
Selma	Johnston	4,356	4,762	9.3
Seven Devils	Avery, Watauga	0	54	0
Seven Springs	Wayne	188	166	-11.7
Severn	Northampton	356	309	-13.2
Shady Forest	Brunswick	17	43	152.9
Shallotte	Brunswick	597	680	13.9
Sharpsburg	(b)	789	997	26.4
Shelby	Cleveland	16,328	15,310	-6.2
Siler City	Chatham	4,689	4,446	-5.2
Simpson	Pitt	383	407	6.3
Sims	Wilson	205	192	-6.3
Smithfield	Johnston	6,677	7,288	9.2
Snow Hill	Greene	1,359	1,374	1.1
Southern Pines	Moore	5,937	8,620	45.2
Southern Shores	Dare	75	395	NA
Southport	Brunswick	2,220	2,824	27.2
Sparta	Alleghany	1,304	1,687	29.4
Speed	Edgecombe	142	95	-33.1
Spencer	Rowan	3,075	2,938	-4.5
Spencer Mountain	Gaston	300	169	-43.7
Spindale	Rutherford	3,848	4,246	10.3
Spring Hope	Nash	1,334	1,254	-6.0
Spring Lake	Cumberland	3,968	6,273	58.1
Spruce Pine	Mitchell	2,333	2,282	-2.2
St. Pauls	Robeson	2,011	1,639	-18.5
Staley	Randolph	239	204	-14.6
Stallings	Union	726	1,826	151.5
Stanfield	Stanly	458	463	1.1
Stanley	Gaston	2,336	2,341	0.2
Stantonsburg	Wilson	869	920	5.9
Star	Montgomery	892	816	-8.5
Statesville	Iredell	20,007	18,622	-6.9
Stedman	Cumberland	505	723	43.2
Stem	Granville	242	222	-8.3
Stoneville	Rockingham	1,030	1,054	2.3
Stonewall	Pamlico	335	360	7.5
Stovall	Granville	405	417	3.0

New London	Stanly	285	454	59.3
Newland	Avery	524	722	37.8
Newport	Carteret	1,735	1,883	8.5
Newton	Catawba	7,857	7,624	-3.0
Newton Grove	Sampson	546	564	3.3
Norlina	Warren	969	901	-7.0
Norman	Richmond	157	252	60.5
North Wilkesboro	Wilkes	3,357	3,260	-2.9
Norwood	Stanly	1,896	1,818	-4.1
Oak City	Martin	559	475	-15.0
Oakboro	Stanly	568	587	3.3
Ocean Isle Beach	Brunswick	78	143	83.3
Old Fort	McDowell	676	752	11.2
Old Sparta	Edgecombe	NA	NA	NA
Oriental	Pamlico	445	536	20.4
Orrum	Robeson	162	167	3.1
Oxford	Granville	7,178	7,603	5.9
Pantego	Beaufort	218	185	-15.1
Parkton	Robeson	550	564	2.5
Parmele	Martin	373	484	29.8
Patterson Springs	Cleveland	478	731	52.9
Peachland	Anson	556	506	-9.0
Pembroke	Robeson	1,982	2,698	36.1
Pikeville	Wayne	580	662	14.1
Pilot Mountain	Surry	1,309	1,090	-16.7
Pine Knoll Shores	Carteret	62	646	941.9
Pine Level	Johnston	983	953	-3.1
Pinebluff	Moore	570	935	64.0
Pinehurst	Moore	1,056	NA	NA
Pinetops	Edgecombe	1,379	1,465	6.2
Pineville	Mecklenburg	1,948	1,525	-21.7
Pink Hill	Lenoir	522	644	23.4
Pittsboro	Chatham	1,447	1,332	-7.9
Plymouth	Washington	4,774	4,571	-4.3
Polkton	Anson	845	762	-9.8
Polkville	Cleveland	494	528	6.9
Pollocksville	Jones	456	318	-30.3
Powellsville	Bertie	247	320	29.6
Princeton	Johnston	1,044	1,034	-1.0
Princeville	Edgecombe	654	1,508	130.6
Proctorville	Robeson	157	205	30.6%
Raeford	Hoke	3,180	3,630	14.2
Raleigh	Wake	122,830	150,255	22.3
Ramseur	Randolph	1,328	1,162	-12.5
Randleman	Randolph	2,312	2,156	-6.7
Ranlo	Gaston	2,092	1,774	-15.2
Raynham	Robeson	75	83	10.7
Red Oak	Nash	359	314	-12.5
Red Springs	Robeson	3,383	3,607	6.6
Reidsville	Rockingham	13,636	12,492	-8.4
Rennert	Robeson	175	178	1.7
Rhodhiss	Burke, Caldwell	784	727	-7.3
Rich Square	Northampton	1,254	1,057	-15.7
Richfield	Stanly	306	373	21.9
Richlands	Onslow	935	825	-11.8
Roanoke Rapids	Halifax	13,508	14,702	8.8
Robbins	Moore	1,059	1,256	18.6
Robbinsville	Graham	777	1,370	76.3
Robersonville	Martin	1,910	1,981	3.7
Rockingham	Richmond	5,852	8,300	41.8
Sunset Beach	Brunswick	108	304	181.5
Surf City	Pender	166	391	135.5
Swansboro	Onslow	1,207	976	-19.1
Sylva	Jackson	1,561	1,699	8.8
Tabor City	Columbus	2,400	2,710	12.9
Tar Heel	Bladen	87	118	35.6
Tarboro	Edgecombe	9,425	8,634	-8.4
Taylorville	Alexander	1,231	1,103	-10.4
Teachey	Duplin	219	373	70.3
Thomasville	Davidson	15,230	14,144	-7.1
Topsail Beach	Pender	108	264	144.4
Trent Woods	Craven	719	1,177	63.7
Trenton	Jones	539	407	-24.5
Troutman	Iredell	797	1,360	70.6
Troy	Montgomery	2,429	2,702	11.2
Tryon	Polk	1,951	1,796	-7.9
Turkey	Sampson	329	417	26.7
Unionville	Union	NA	NA	NA
Valdese	Burke	3,182	3,364	5.7
Vanceboro	Craven	758	833	9.9
Vandemere	Pamlico	379	335	-11.6
Vass	Moore	885	828	-6.4
Waco	Cleveland	245	322	31.4
Wade	Cumberland	315	474	50.5
Wadesboro	Anson	3,977	4,206	5.8
Wagram	Scotland	718	617	-14.1
Wake Forest	Wake	3,148	3,780	20.1
Wallace	Duplin, Pender	2,905	2,903	-0.1
Walnut Cove	Stokes	1,213	1,147	-5.4
Walnut Creek	Wayne	81	343	323.5
Walstonburg	Greene	176	181	2.8
Warrenton	Warren	1,035	908	-12.3
Warsaw	Duplin	2,701	2,910	7.7
Washington	Beaufort	8,961	8,418	-6.1
Washington Park	Beaufort	517	514	-0.6
Watha	Pender	181	196	8.3
Waxhaw	Union	1,248	1,208	-3.2
Waynesville	Haywood	6,488	6,765	4.3
Weaverville	Buncombe	1,280	1,495	16.8
Webster	Jackson	181	200	10.5%
Weldon	Halifax	2,304	1,844	-20.0%
Wendell	Wake	1,929	2,222	15.2
West Jefferson	Ashe	889	822	-7.5
Whispering Pines	Moore	362	1,160	220.4
Whitakers	Edgecombe, Nash	926	924	-0.2
White Lake	Bladen	232	968	317.2
Whiteville	Columbus	4,195	5,565	32.7
Wilkesboro	Wilkes	2,038	2,335	14.6
Williamsboro	Vance	NA	59	NA
Williamston	Martin	6,570	6,159	-6.3
Wilmington	New Hanover	46,169	44,000	-4.7
Wilson	Wilson	29,347	34,424	17.3
Windsor	Bertie	2,199	2,126	-3.3
Winfall	Perquimans	581	634	9.1%
Wingate	Union	2,569	2,615	1.8
Winston-Salem	Forsyth	133,683	131,885	-1.3
Winterville	Pitt	1,437	2,052	42.8
Winton	Hertford	917	825	-10.0
Woodfin	Buncombe	2,831	3,260	15.2
Woodland	Northampton	744	861	15.7
Woodville	Bertie	253	212	-16.2
Wrightsville Beach	New Hanover	1,701	2,910	71.1
Yadkinville	Yadkin	2,232	2,216	-0.7
Yaupon Beach	Brunswick	334	569	70.4
Youngsville	Franklin	555	486	-12.4
Zebulon	Wake	1,839	2,055	11.7
North Carolina Municipal Population		2,210,008	2,476,041	15.6

(a) Davidson, Guilford, and Randolph counties.
(b) Edgecombe, Nash, and Wilson counties.
NA - Not Available

SOURCE: U.S. Department of Commerce, Bureau of the Census.
Office of State Budget and Management, Research and Planning Services.

Table 18

POPULATION DENSITY[a] OF PLACES WITH 2,500 OR MORE INHABITANTS
YEARS 1960, 1970 AND 1980

Place	1960	1970	1980
Ahoskie	3,274	2,687	1,880
Albemarle	2,151	1,918	1,035
Apex	1,052	NA	1,139
Archdale	1,382	1,130	942
Asheboro	2,197	2,076	1,387
Asheville	2,774	2,587	1,867
Ayden	2,072	2,029	1,817
Beaufort	5,844	3,062	1,594
Belmont	2,635	2,292	1,772
Benson	2,355	NA	2,148
Bessemer City	1,217	1,581	1,496
Black Mountain	1,313	1,001	972
Bonnie Doone (CDP)	953	NA	1,700
Boone	2,304	2,245	2,682
Brevard	2,857	2,497	2,047
Brogden (CDP)	NA	NA	1,358
Burlington	2,677	2,364	2,231
Butner (CDP)	NA	1,220	1,514
Camp Lejeune Central (CDP)	NA	2,107	1,636
Canton	973	2,715	2,437
Carrboro	2,853	1,265[b]	2,934
Cary	1,243	1,161	2,176
Chapel Hill	3,592	3,274	2,594
Charlotte	3,199	3,173	2,251
Cherryville	2,576	1,813	1,794
Clayton	1,660	1,939	1,023
Clemmons (CDP)	NA	NA	705
Clinton	2,487	2,105	1,678
Concord	3,632	2,676	2,017
Conover	2,851	2,237	1,249
Dallas	1,721	2,136	2,386
Davidson	2,573	1,466	1,350
Dunn	3,153	2,025	1,867
Durham	3,676	2,608	2,484
East Flat Rock (CDP)	822	938	990
East Rockingham (CDP)	2,676	2,382	1,442
Eden	NA	1,356	1,339
Edenton	2,026	1,362	1,488
Elizabeth City	3,430	2,814	2,980
Elizabethtown	2,321	NA	986
Elkin	896	906	752
Elon College	2,140	NA	2,394
Elroy (CDP)	NA	NA	590
Enfield	2,482	2,727	2,496
Enka (CDP)	NA	NA	843
Enochville (CDP)	NA	NA	696
Erwin	2,449	2,194	1,768
Fairmont	1,203	1,767	1,477
Fairplains (CDP)	NA	NA	634
Farmville	3,075	2,458	2,241
Fayetteville	3,205	2,287	1,803
Forest City	1,681	825	1,220
Fort Bragg (CDP)	NA	2,701	2,213
Franklin	701	NA	852
Fuquay-Varina	1,093	1,192	972
Garner	1,726	2,140	2,143
Gastonia	3,584	2,369	2,181
Gibsonville	1,784	NA	1,791
Glen Raven (CDP)	1,051	1,499	672
Goldsboro	4,067	2,979	2,213
Gorman (CDP)	NA	NA	256
Graham	2,340	2,335	1,807
Granite Falls	1,469	NA	992
Lumberton	2,834	3,141	1,614
Madison	2,731	NA	510
Malden	NA	NA	1,287
Marion	2,573	2,382	2,047
Mar-Mac (CDP)	NA	NA	732
Masonboro (CDP)	NA	NA	616
Maxton	1,950	NA	1,595
Mayodan	3,380	2,875	1,751
Mebane	1,689	NA	1,855
Mint Hill	NA	NA	574
Mocksville	743	790	733
Monroe	1,727	1,736	1,620
Mooresville	2,096	1,957	1,824
Morehead City	3,722	3,489	2,180
Morganton	2,355	1,841	1,012
Mount Airy	2,822	1,592	1,430
Mount Holly	2,125	1,459	1,562
Mount Olive	3,115	2,730	2,438
Murfreesboro	1,888	2,339	1,769
Myrtle Grove (CDP)	NA	NA	381
Nashville	2,372	NA	1,275
New Bern (CDP)	6,287	3,858	2,510
New Hope (CDP) (Wake County)	NA	NA	602
New Hope (CDP) (Wayne County)	NA	NA	942
New River Station (CDP)	NA	1,192	711
Newton	2,018	2,910	1,588
North Belmont (CDP)	1,028	1,098	1,170
North Wilkesboro	976	746	724
Ogden (CDP)	NA	NA	574
Oxford	2,251	1,795	2,001
Parkwood (CDP)	NA	NA	1,710
Pembroke	1,524	NA	3,373
Pinehurst (CDP)	934	NA	135
Pine Valley (CDP)	NA	NA	929
Piney Green-White Oak (CDP)	NA	NA	556
Plymouth	1,728	1,540	1,203
Poplar Tent (CDP)	NA	NA	461
Pumpkin Center (CDP)	NA	NA	852
Raeford	1,176	1,178	1,344
Raleigh	2,787	2,708	2,793
Red Springs	2,516	1,990	1,202
Reidsville	1,877	1,794	1,666
Roanoke Rapids	2,562	2,289	2,014
Rockingham	1,969	1,773	1,627
Rocky Mount	3,457	2,765	2,281
Rosewood (CDP)	NA	NA	564
Roxboro	2,145	2,238	2,036
Rutherfordton	1,305	1,248	1,374
St. Stephens (CDP)	NA	NA	900
Salem (CDP) (Burke County)	NA	NA	601
Salisbury	3,435	2,649	1,718
Sanford	2,785	2,663	1,252
Scotland Neck	2,704	2,391	1,889
Seagate (CDP)	NA	NA	815
Selma	2,585	2,904	2,381
Shelby	2,493	2,206	1,988
Siler City	1,142	1,172	1,112
Silver Lake (CDP)	NA	NA	541
Smithfield	2,781	2,087	1,157
Southern Pines	1,181	1,142	1,119
South Gastonia (CDP)	1,344	NA	1,362
South Goldsboro (CDP)	NA	NA	791
Southport	1,071	NA	1,569

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Greensboro	2,411	2,648	2,581
Greenville	3,629	2,549	2,383
Half Moon (CDP)	NA	NA	570
Hamlet	2,478	2,012	1,888
Havelock	1,217	1,506(b)	979
Henderson	3,267	3,563	2,940
Hendersonville	2,815	2,478	2,214
Hickory	2,196	2,078	1,715
Hickory North (CDP)	467	NA	636
High Point	2,035	2,052	2,012
Hillsborough	2,698	NA	1,372
Hope Mills	652	NA	1,546
Hudson	960	1,175	1,155
Jacksonville	4,352	3,815	2,159
Jacksonville East (CDP)	NA	NA	3,083
James City (CDP)	921	1,432	1,055
Kannapolis (CDP)	1,403	1,214	1,434
Kernersville	1,634	1,605	1,620
King (CDP)	NA	NA	431
Kings Grant (CDP)	NA	NA	1,238
Kings Mountain	2,503	1,881	1,816
Kinston	5,065	3,718	2,804
La Grange	2,370	NA	1,574
Laurinburg	2,010	1,926	1,573
Lenoir	2,385	1,400	1,109
Lewisville (CDP)	NA	NA	433
Lexington	2,775	1,670	2,123
Lincolnton	2,850	2,647	1,877
Long View	2,141	2,100	2,110
Louisburg	2,044	2,101	1,542
Lowell	1,326	1,575	1,167
Spencer	1,815	1,922	1,399
Spindale	1,856	1,749	923
Spring Lake	3,736	3,607	2,163
Stanleyville (CDP)	711	NA	646
Statesville	2,181	2,127	1,663
Swannanoa (CDP)	1,288	NA	266
Tabor City	2,126	NA	1,084
Tarboro	4,427	2,547	2,272
Thomasville	2,713	2,343	2,080
Trinity (CDP)	NA	NA	604
Troy	1,564	NA	1,589
Valdese	1,279	1,326	1,085
Wadesboro	1,783	1,591	1,682
Wake Forest	1,776	2,099	1,800
Wallace	1,904	2,421	1,075
Warsaw	1,709	1,422	1,213
Washington	5,231	2,358	1,913
Waynesville	2,124	2,093	1,990
Welcome (CDP)	NA	NA	345
West Concord (CDP)	2,204	2,228	792
Whiteville	2,036	1,678	1,357
Williamston	2,473	2,666	2,053
Wilmington	5,791	2,638	2,047
Wilson	4,228	3,623	2,608
Windemere (CDP)	NA	NA	1,055
Wingate	1,449	NA	2,012
Winston-Salem	3,399	2,352	2,173
Winter Park (CDP)	NA	NA	1,732
Woodfin	NA	NA	959
Wrightsboro (CDP)	NA	NA	486
Wrightsville Beach	NA	NA	2,079

(a) Population per square mile of land area.
(b) Revised.
CDP Census Designated Place.
NA Not Available

NOTE: Figures are shown as they appear in the Census Bureau's published documents and do not reflect any corrections that were made to the population counts since revisions to the land area are not available.

SOURCE: U.S. Department of Commerce, Bureau of the Census.

Ref. 13

26 August 1986

Ref.14

TO: File

FROM: Jack Butler

RE: Telephone conversation with Steve Wyatt, Town Manager, Chadbourn [(919) 654-4146] about water distribution in Chadbourn.

Mr. Wyatt was contacted on this date to obtain information about the areas served by the Chadbourn water department. Mr. Wyatt reported that everyone within the town limits is served and many outside, especially those to the east toward Whiteville. Mr. Wyatt does not have a map of the complete area but will send a letter outlining the areas served.

JB/tb/0210b

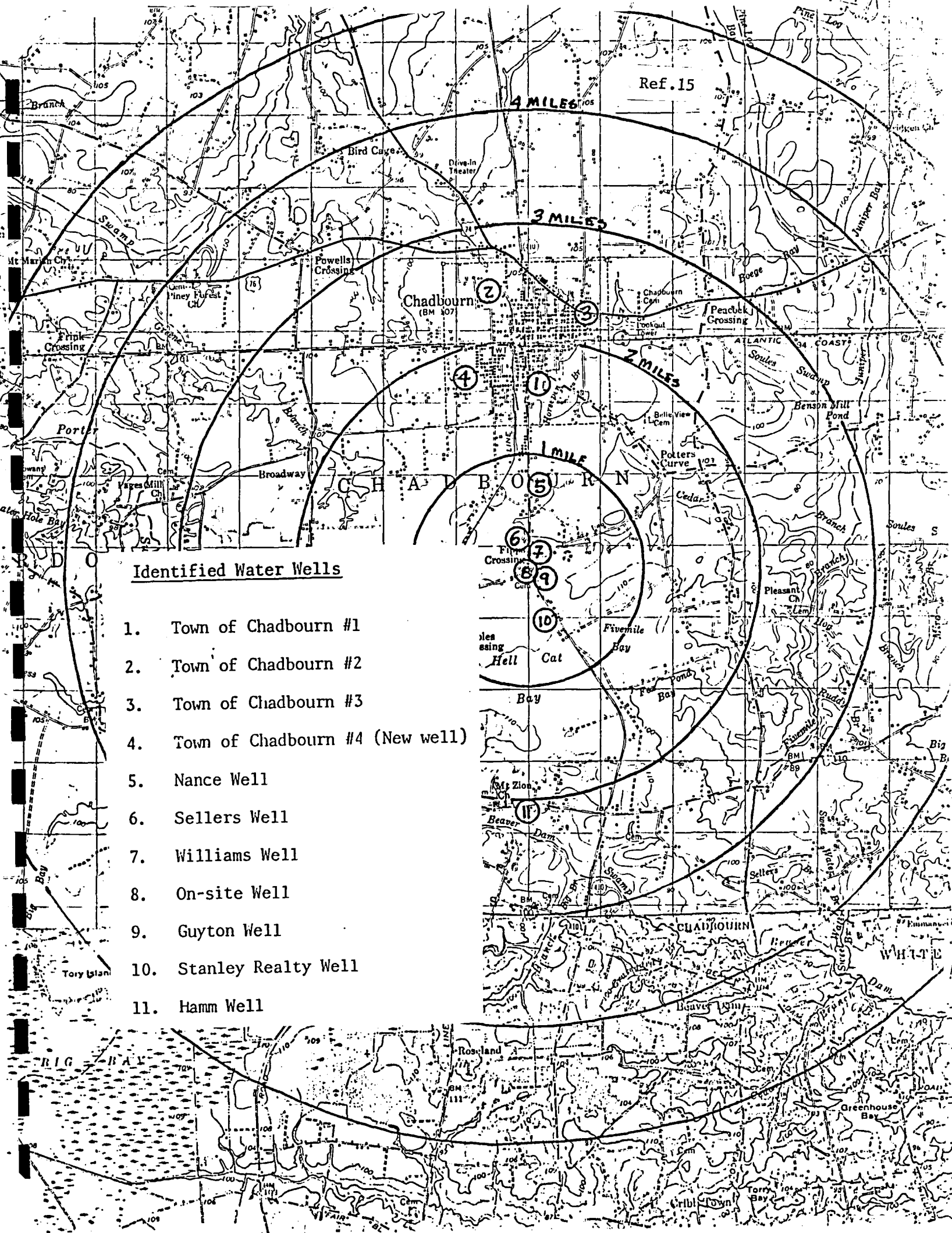
Ref.15

SITE INSPECTION REPORT

Guyton Battery Service
NC 410
Chadbourn, NC 28431
NC D024459471

July 9, 1986

Grover C. Nicholson, Geologist
NC Division of Health Services
Environmental Health Section
Solid and Hazardous Waste Management Branch
CERCLA Unit


Ref.15
4 MILES
3 MILES
2 MILES
1 MILE
Chadbourn
Bird Cage
Drive-In Theater
Powells Crossing
Chadbourn Cem
Peacock Crossing
Lookout Tower
ATLANTIC COAST
Frink Crossing
Porter
Broadway
Pages Mill Ch
Potters Curve
Benson Mill Pond
Cedar
Pleasant Ch
Fivemile Bay
Hell Cat Bay
Mt Zion Ch
Beaver Dam
Sellers
CHADBOURN
WHITE
Rosland
BIG BAY
Greenhouse Bay
Cribb Town
Torry Bay
Identified Water Wells
1. Town of Chadbourn #1
2. Town of Chadbourn #2
3. Town of Chadbourn #3
4. Town of Chadbourn #4 (New well)
5. Nance Well
6. Sellers Well
7. Williams Well
8. On-site Well
9. Guyton Well
10. Stanley Realty Well
11. Hamm Well

Ref.16

TOWN OF CHADBOURN

"The Strawberry Capital"

208 EAST FIRST AVENUE, CHADBOURN, NORTH CAROLINA 28431

August 2, 1986

Mr. Jack Butler
Division of Health Services
Solid and Hazardous Waste Branch
C.E.R.C.L.A. Unit
P.O. Box 2091
Raleigh, N.C. 27602

Dear Mr. Butler,

The Town of Chadbourn furnishes water to approxiately two thousand residents at all points within the Town Corporate limits. In addition water is provided to residents along a three and one tenth mile long corridor following NC Highway 130 east. Approxiamately one hundred and twenty five households are connected through the Chadbourn Rural Water association. Maps of these rural water lines are not available.

I hope this information is helpful to you. If I can be of further assistance don't hesitate to call

Sincerely,

Steven D. Wyatt

Steven D. Wyatt
Town Manager

TOWN OF CHADBOURN
208 EAST FIRST AVENUE
CHADBOURN, NORTH CAROLINA 28431
"The Strawberry Capital"

CHADBOURN, NC
SEP 2
PM

Mr. Jack Butler
Division of Health Services
P.O. Box 2091
Raleigh, N.C. 27602

Ref.16

TOWN OF CHADBOURN

"The Strawberry Capital"

208 EAST FIRST AVENUE, CHADBOURN, NORTH CAROLINA 28431

August 2, 1986

Mr. Jack Butler
Division of Health Services
Solid and Hazardous Waste Branch
C.E.R.C.L.A. Unit
P.O. Box 2091
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I hope this information is helpful to you. If I can be of further assistance don't hesitate to call

Sincerely,

Steven D. Wyatt

Steven D. Wyatt
Town Manager

27 August 1986

TO: File

Ref.17

FROM: Jack Butler

RE: Telephone conversation with Mike Taylor, Whiteville City Engineer [(919) 64208046] about water service in Whiteville.

Mr. Taylor agreed to send a copy of the water distribution map for Whiteville. Their source of water is 4 wells and they serve about 8,000 residents. All 4 wells are within the city limits of Whiteville. The town is presently drilling a fifth well.

JB/tb/0321b

5 September 1986 Ref.18

TO: File

FROM: Jack Butler

RE: Brunswick water supply

Mr. Belton Blackman, water superintendent for the Town of Brunswick, [(919) 642-6741] reported that Brunswick has 2 wells. One is in downtown Brunswick near Hwy. 130 and the other is about 1 mile northwest of Brunswick on Hwy. 130 in a subdivision called Cherry Acres. These 2 wells serve approximately 100 residents.

JB/tb/0321b

5 September 1986

Ref.19

TO: File

FROM: Jack Butler

RE: Duchess Forest Water Supply, and Lakeland Village Subdivision.

Mrs. Juanita Stanley, owner [(919) 642-5023] reported that Duchess Forest is served by 2 wells. Both wells are on the left side of Hwy. 130 approximately 1 mile south of Brunswick. These wells serve 34 families.

Mrs. Stanley also has 2 wells at Lakeland Village Subdivision at the intersection of U.S. 74/76 and Honey Hill Road. This is about 2 miles east of Whiteville and more than 6 miles from the USS Agri Chemicals Farm Service site.

JB/tb/0321b

Ref.20

REPORT DATE 07/15/86 GRID CORDINATES (CORD W04RPT VS100D) PAGE 1

JACK BUTLER

PWID	PWMANAME	PWMAARCO	PWMAPNUM	PWPLTYPE	PWPLACTV	PWPLSOC1	PWPLLAT1	PWPLLON1	PWPLPOPL
0424025	CHADBOURN RURAL WATER ASSOC		0000000	C	A	W	0341915	0784950	000000085
0424040	BRUNSWICK TOWN OF	919	6426741	C	A	G	0341715	0784215	000000100
0424102	DUCHESS FOREST WATER SUPPLY	919	6425023	C	A	G	0341730	0784115	000000150
0424111	COLUMBUS CO CORRECTION FAC		0000000	C	A	G	0341700	0784330	000000265
0424463	LAKELAND VILLAGE SUBDIVISION	919	6425023	C	A	G	0341630	0784130	000000100
0424489	NEW HOPE BAPT CHURCH	919	6425520	N	A	G	0341645	0784500	000000350
0424517	LEBANON UNITED METH CHURCH	919	6332661	N	A	G	0341315	0784515	000000070
0424528	WARD'S STATION CHURCH OF GOD	919	6544408	N	A	G	0341600	0784945	000000050
0424538	BEAVERDAM BAPT CHURCH	919	6534675	N	A	G	0341415	0784730	000000725
0424540	FAITH BAPTIST CHURCH	919	6425335	N	A	G	0341615	0784700	000000055
0424551	TRI-COUNTY FARMERS CO-OP	919	6425108	N	A	G	0341645	0784445	000000030
0424613	CLARENDON 1ST BAPTIST CHURCH	919	6533312	N	A	G	0341230	0784930	000000059
0424631	FREE WELCOME CHURCH	919	6427935	N	A	G	0341500	0784545	000000085
0424633	MT. SINIA BAPT. CHURCH	919	6534223	N	A	G	0341115	0784800	000000090
0424637	701 SERVICE CENTER	919	6428686	N	A	G	0341500	0784515	000000060
0424638	USS AGRI CHEMICALS	919	6424006	N	A	G	0341500	0784515	000000030
0424639	WELCOME PFWB CHURCH	919	6533422	N	A	G	0341245	0784815	000000110
0424640	CLARENDON BAPT CHURCH	919	6532791	N	A	G	0341200	0784945	000000080
0424647	PLEASANT PLAINS GROCERY	919	6427949	N	A	G	0341415	0784100	000000700
0424662	PLEASANT MEADOW F W B CHURCH	919	6428471	N	A	G	0341145	0784030	000000070
0424663	FAITH HOLINESS CHURCH	919	6425674	N	A	G	0341230	0784300	000000040
0424761	PLEASANT PLAINS BAPTIST CHURCH	919	6423939	N	A	G	0341430	0784045	000000175
0424763	PLEASANT HILL BAPT CHURCH	919	6543960	N	A	G	0341700	0784700	000000187
0424777	ANTIOCH BAPTIST CHURCH	919	6427962	N	A	G	0341415	0784245	000000090
									000003756

NUMBER OF RECORDS SELECTED FOR THE REPORT = 24

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ENDANGERED SPECIES FIELD STATION
100 OTIS STREET, ROOM 224
ASHEVILLE, NORTH CAROLINA 28801

Ref.21

June 21, 1985

Ms. Pat Derosa
Solid and Hazardous Waste Management Branch
Environmental Health Section
North Carolina Department of Human Resources
P. O. Box 2091
Raleigh, North Carolina 27602

Dear Ms. Derosa,

In response to your telephone conversation with John Fridell on May 30, 1985, we are enclosing the following items of information:

A. North Carolina county distribution records of Federally listed, proposed and status review species,

B. map of the critical habitat of the threatened spotfin chub (Hybopsis monacha),

C. map of the critical habitat of mountain golden heather (Hudsonia montana), and

D. copy of the U.S. Fish and Wildlife Service interagency Section 7 consultation process guidelines (included for your information)

The abbreviations following the species names on the North Carolina species distribution records (A. above) indicate Federal status, i.e., E - endangered, T - threatened, PE - proposed endangered, PT - proposed threatened and SR - under status review. Status review species are not legally protected under the Endangered Species Act. However, they are subject to being listed and agencies should be cognizant of their potential presence in a project area.

Since additions and deletions are made to the list of species on a regular basis, questions regarding updates of the list should be made to this office.

We hope this information will be of use to you. If we can be of any further assistance, please call John Fridell or Nora Murdock at (704) 259-0321.

Sincerely yours,

Warren T. Parker

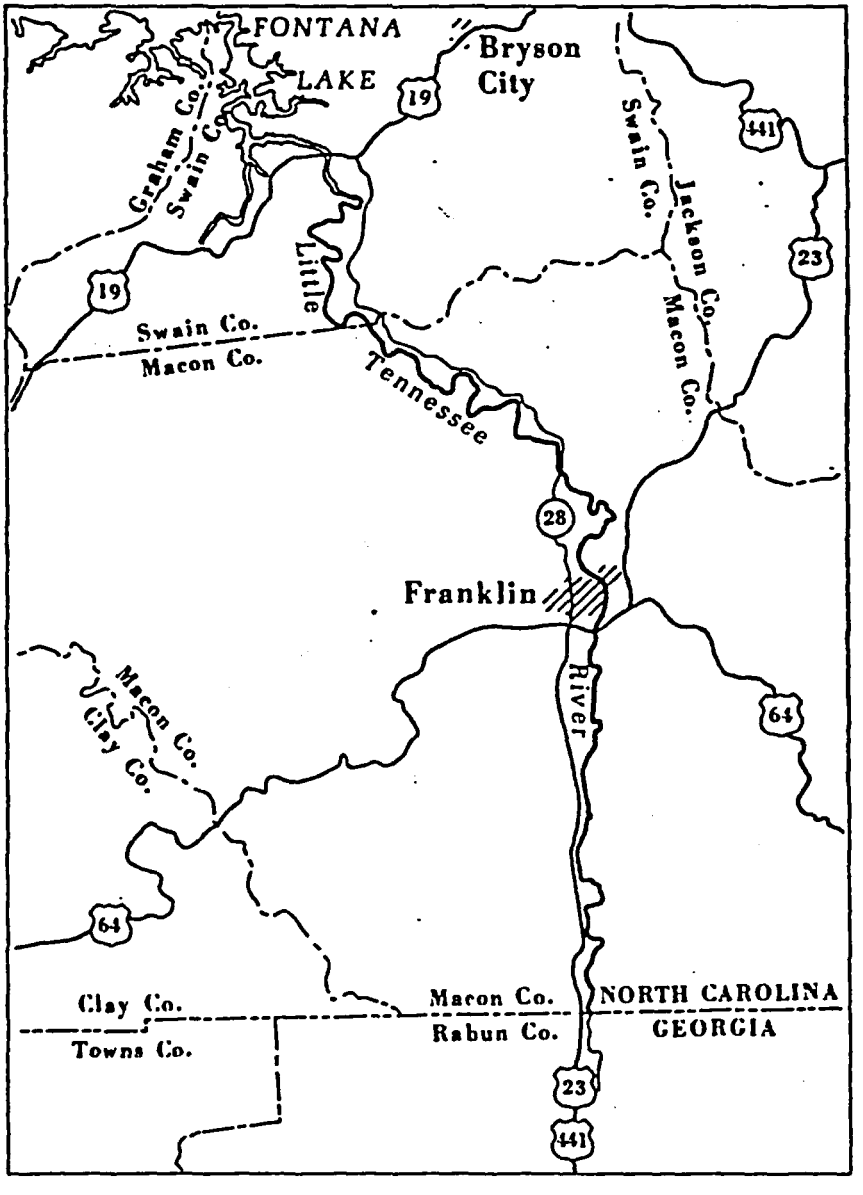
Warren T. Parker
Field Supervisor

Ref.21

NORTH CAROLINA - Critical Habitat

Hybopsis monacha, "spotfin chub"

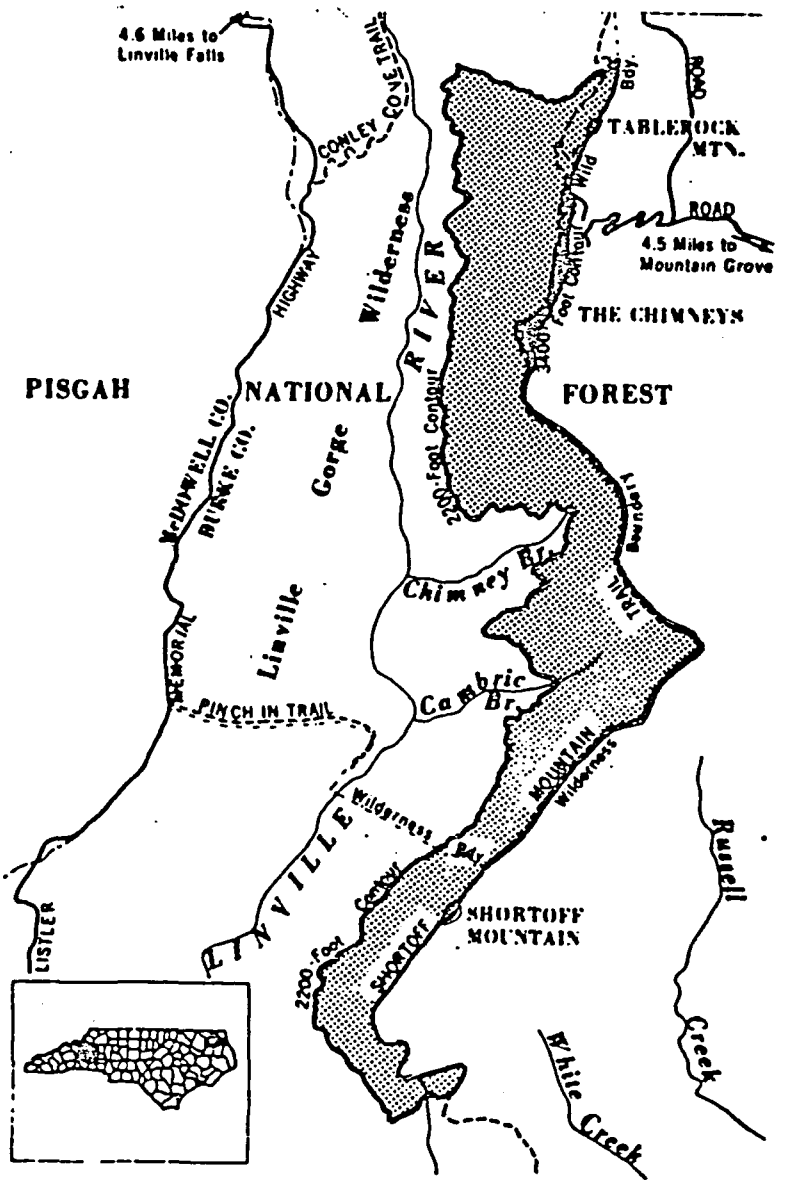
Macon and Swain Counties. Little Tennessee River, main channel from the backwaters of Fontana Lake upstream to the North Carolina-Georgia state line.



NORTH CAROLINA - Critical Habitat

Hudsonia montana, "mountain golden heather"

Burke County. The area bounded by the following: on the west by the 2200' contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2200' contour and the Shortoff Mountain Trail to where it intersects the 3400' contour at "The Chimneys"--then follow the 3400' contour north until it reintersects the Wilderness Boundary--then follow the Wilderness Boundary again northward until it intersects the 3200' contour extending west from its intersection with the Wilderness Boundary until it begins to turn south--at this point the Boundary extends due east until it intersects the 2200' contour.



Ref.22

12 August 1986

TO: CERCLA Unit Staff

FROM: Pat DeRosa

RE: Critical Habitats of Federally Listed Endangered Species in N.C.

I spoke by telephone today with John Fridell, US Fish and Wildlife Service (704) 259-0321 to request an update on critical habitats in NC. Mr. Fridell informed me that the only change since our previous correspondence of June 21, 1985 has been a "Proposal to List the Cape Fear Shiner as an Endangered Species with Critical Habitats" in NC. (FR Vol. 51, No. 133, July 11, 1986). A copy of the proposed rule is attached for your information.

PD/tb/0221b

$$\frac{C_{TRS}}{C_{RC}} \times 100 \quad \text{Eq. 15A-A}$$

7. Bibliography

1. American Society for Testing and Materials. Annual Book of ASTM Standards. Part 31: Water, Atmospheric Analysis. Philadephia, Pennsylvania. 1974. p. 40–42.

2. Blosser, R.O., H.S. Oglesby, and A.K. Jain. A study of Alternate SO_2 Scrubber Designs Used for TRS Monitoring. National Council of the Paper Industry for Air and Stream Improvement, Inc., New York, New York. Special Report 77–05. July 1977.

3. Curtis, F., and G.D. McAlister. Development and Evaluation of an Oxidation/Method 6 TRS Emission Sampling Procedure. Emission Measurement Branch, Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. February 1980.

4. Gellman, I. A Laboratory and Field Study of Reduced Sulfur Sampling and Monitoring Systems. National Council of the Paper Industry for Air and Stream Improvement, Inc., New York, New York. Atmospheric Quality Improvement Technical Bulletin No. 8. October 1975.

5. Margeson, J.H., J.E. Knoll, M.R. Midgett, B.B. Ferguson, and P.J. Schworer. A Manual Method for TRS Determination. Journal of Air Pollution Control Association. 35:1280–1286. December 1985.

[FR Doc. 86–15288 Filed 7–10–86; 8:45 am]

BILLING CODE 6560–50–M

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Proposal to List the Cape Fear Shiner as an Endangered Species with Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The Service proposes to list the Cape Fear shiner (*Notropis mekistocholas*) as an endangered species with critical habitat under the Endangered Species Act of 1973, as amended. This fish has recently undergone a reduction in range and population. It is currently known from only three small populations in the Cape Fear River drainage in Randolph, Moore, Lee, and Chatham Counties, North Carolina. Due to the species' limited distribution, any factor that degrades habitat or water quality in the short river reaches it inhabits—e.g., land use changes, chemical spills, wastewater discharges, impoundments, changes in stream flow, or increases in agricultural runoff—could threaten the species' survivial. Comments and information pertaining to this proposal are sought from the public.

DATES: Comments from all interested parties must be received by September 9, 1986. Public hearing requests must be received by August 25, 1986.

ADDRESSES: Comments and materials concerning this proposal should be sent to Field Supervisor, Endangered Species Field Office, U.S. Fish and Wildlife Service, 100 Otis Street, Room 224, Asheville, North Carolina 28801. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Richard G. Biggins, at the above address (704/259–0321 or FTS 672–0321).

SUPPLEMENTARY INFORMATION:

Background

The Cape Fear shiner (*Noropis mekistocholas*), the only endemic fish known from North Carolina's Cape Fear River drainage, was discovered in 1962 and described by Snelson (1971). This fish has been collected from nine stream reaches in North Carolina (Bear Creek, Rocky River, and Robeson Creek, Chatham County; Fork Creek, Randolph County; Deep River, Moore and Randolph Counties; Deep River, Chatham and Lee Counties; and Cape Fear River, Kenneth Creek, and Parkers Creek, Harnett County (Snelson 1971, W. Palmer and A. Braswell, North Carolina State Museum of Natural History, personal communication 1985, Pottern and Huish 1985, 1986). Based on a recently completed Service-funded study (Pottern and Huish 1985, 1986) involving extensive surveys in the Cape Fear River Basin (including all historic sites) and a review of historical fish collection records from the Cape Fear, Neuse, and Yadkin River systems, the fish is now restricted to only three populations. The strongest population (101 individuals collected in 1984 and 1985) is located around the junction of the Rocky River and Deep River in Chatham and Lee Counties where the fish inhabits the Deep River from the upstream limits of the backwaters of Locksville Dam upstream to the Rocky River then upstream from the Rocky River to Bear Creek and upstream from Bear Creek to the Chatham County Road 2156 Bridge. A few individuals were collected just downstream of the Locksville Dam, but because of the limited extent of Cape Fear shiner habitat at this site, it is not believed this is a separate population. Instead, it is thought these fish represent a small number of individuals that periodically drop down from the population above Locksville Dam pool.

Ref.22

The second population, represented by the collection of a specimen near State Highway Bridge 902 in Chatham County, is located above the Rocky River Hydroelectric Dam. This population was historically the best, but the area yielded only the one specimen after extensive surveys by Pottern and Huish (1985). The third population was found in the Deep River system in Randolph and Moore Counties. This population is believed to be small (Pottern and Huish 1985, 1986). Three individuals were found above the Highfalls Hydroelectric Reservoir; one in Fork Creek, Randolph County, and two in the Deep River, Moore County. The species was also found downstream of the highfalls Dam. However, the extent of suitable habitat in this stream reach is limited, and it is thought that these individuals likely result from downstream movement from above the reservoir where Cape Fear shiner habitat is more extensive.

The Caper Fear shiner is small, rarely exceeding 2 inches in length. The fish's body is flushed with a pale silvery yellow, and a black band runs along its sides (Snelson 1971). The fins are yellowish and somewhat pointed. The upper lip is black, and the lower lip bears a thin black bar along its margin. The Cape Fear shiner, unlike most other members of the large genus *Notropis*, feeds extensively in plant material, and its digestive tract is modified for this diet by having an elongated, convoluted intestine. The species is generally associated with gravel, cobble, and boulder substates and has been observed to inhabit slow pools, riffles, and slow runs (Snelson 1971, Pottern and Huish 1985). In these habitats, the species is typically associated with schools of other related species, but it is never the numerically dominant species. Juveniles are often found in slackwater, among large rock outcrops in mid-stream, and in flooded side channels and pools (Pottern and Huish 1985). No information is presently available on breeding behavior, fecundity, or longevity.

The Cape Fear shiner may always have existed in low numbers. However, its recent reduction in range and its small population size (Pottern and Huish 1985, 1986) increases the species' vulnerability to a catastrophic event, such as a toxic chemical spill. Dam construction in the Cape Fear system has probably had the most serious impact on the species by inundating the species' rocky riverine habitat. Dams

presently under study by the U.S. Department of the Army, Corps of Engineers (COE), for the Deep River and changes in flow regulation at existing hydroelectic facilities could further threaten the species. The deterioration of water quality has likely been another factor in the species' decline. The North Carolina Department of Natural Resources and Community Development (1983) classified water quality in the Deep River, Rocky River, and Bear Creek as good to fair, and referred to the Rocky river below Siler City as an area where their sampling indicates degradation. That report also stated: "Within the Cape Fear Basin, estimated average annual soil losses from cropland ranged from 3 tons per acre in the lower basin to 12 tons in the headwaters." The North Carolina State Division of Soil and Water Conservation considers 5 tons of soil loss per acre as the maximum allowable.

The Cape Fear shiner was one of 29 fish species included in a March 18, 1975, Notice of Review published by the Service in the Federal Register (40 FR 12297). On December 30, 1982, the Service announced in the Federal Register (47 FR 58454) that the Cape Fear shiner, along with 147 other fish species, was being considered for possible addition to the list of Endangered and Threatened Wildlife. On April 4, 1985, the Service notified Federal, State, and local governmental agencies and interested parties that the Asheville Endangered Species Field Station was reviewing the species' status. That notification requested information on the species' status and threats to its continued existence. Twelve responses to the April 4, 1985, notification were received. The COE, Wilmington District; North Carolina Division of Parks and recreation, Natural Heritage Program; and the North Carolina State Museum of Natrual History provided for the species. Concern for the species' welfare was also expressed by private individuals. The other respondents provided no information on threats, and did not take a position on the species' status. The Cape Fear shiner was included in the Services' September 18, 1985, Notice of review of Vertebrate Wildlife (50 FR 37958) as a category 1 species, indicating that the Service had substantial biological data to support a proposal to list the species as endangered or threatened.

Summary of Factors Affecting the Species

Section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR Part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal Lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Cape Fear shiner (*Notropis mekistocholas*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* A review of historic collection records (Snelson 1971, W. Palmer and A. Braswell personal communication 1985), along with recent survey results (Pottern and Huish 1985, 1986), indicates that the Cape Fear shiner is presently restricted to only three populations (see "Background" section). Three historic populations have apparently been extirpated (Pottern and Huish 1985, 1986). Robeson Creek, Chatham County, was believed lost when Jordan Lake flooded part of the creek. The reasons for the loss of populations from Parkers Creek and Kenneth Creek in Harnett County are not known. The shiner has also not been recollected (Pottern and Huish 1985) from the Cape Fear River in Harnett County. However, review of historical and current collection records reveals that only one specimen has ever been collected from this river, and the fish likely was a stray individual from an upstream or tributary population. Since much of the Deep, Haw, and Cape Fear Rivers and their major tributaries has been impounded for hydroelectric power, and much of the rocky shoal habitat inundated, other populations and population segments that were never discovered have likely been lost to these reservoirs.

Of the three remaining populations, only the one located around the confluence of the Deep and Rocky Rivers in Chatham and Lee Counties (inhabiting a total of about 7.3 river miles) appears strong (Pottern and Huish 1985). The second population in the Rocky River, above the Rocky River hydroelectric facility, was the source of the type specimens used to describe the species (Snelson 1971). Historic records (W. Palmer and A. Braswell, personal communication 1985) reveal that collections of 15 to 30 specimens could be expected in this stretch of the Rocky River (State Route 902 or Chatham County Road 1010 Bridge) during a sampling visit in the late 1960s and early 1970s. Pottern and Huish (1985) sampled the Rocky River throughout this reach on numerous occasions and were able to collect only one specimen. The reason for the apparent decline in this population is unknown. The third population, located in the Deep River system in Moore and Randolph Counties, is represented by the collection of six individuals (Pottern and Huish 1986). Three individuals were taken from below the dam. As the available habitat below the dam is limited, it is believed these fish are migrants from the upstream population.

Potential threats to the species and its habitat could come from such activities as road construction, stream channel modification, changes in stream flows for hydroelectric power, impoundments, land use changes, wastewater discharges, and other projects in the watershed if such activities are not planned and implement with the survival of the species and the protection of its habitat in mind. The species is also potentially threatened by two U.S. Army Corps of Engineers projects presently under review for the Deep River. The Randleman Dam project would consist of a reservoir of the Deep River in Randolph County, above known Cape Fear shiner habitat. The Howards Mill Reservoir would be on the Deep River in Moore and Randolph Counties and would flood presently used Cape Fear shiner habitat.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Most of the present range of the Cape Fear shiner is relatively inaccessible and overutilization of the species has not been and is not expected to be a problem.

C. *Disease or predation.* Although the Cape Fear shiner is undoubtedly consumed by predatory animals, there is no evidence that this predation is a threat to the species.

D. *The inadequacy of existing regulatory mechanisms.* North Carolina State law (Subsection 113-272.4) prohibits collecting wildlife and fish for scientific purposes without a State permit. However, this State law does not protect the species' habitat from the potential impacts of Federal actions. Federal listing will provide protection for the species under the Endangered Species Act by requiring a Federal permit to take the species and requiring Federal agencies to consult with the Service when projects they fund, authorize, or carry out may affect the species.

E. *Other natural or manmade factors affecting its continued existence.* The major portion of the best Cape Fear shiner population is located at the junction of the Deep and Rocky Rivers in Chatham and Lee Counties. A major toxic chemical spill at the U.S. Highway 15-105 Bridge upstream of this site on

the Rocky River could jeopardize this population, and as the other populations are extremely small and tenuous, the species' survival could be threatened.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to propose this rule. Based on this evaluation, the preferred action is to list the Cape Fear shiner (*Notropis mekistocholas*) as an endangered species. Because of the species' restricted range and vulnerability of these isolated populations to a single catastrophic accident, threatened status does not appear to be appropriate for this species (see "Critical Habitat" section for a discussion of why critical habitat is being proposed for the Cape Fear shiner).

Critical Habitat

Critical habitat, as defined by section 3 of the Act means: (i) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 4(a)(3) of the Act requires that critical habitat be designated to the maximum extent prudent and determinable concurrently with the determination that a species is endangered or threatened. Critical habitat is being proposed for the Cape Fear shiner to include: (1) Approximately 5 miles of the Rocky River in Chatham County, North Carolina; (2) approximately 8 miles of Bear Creek, Rocky River, and Deep River in Chatham and Lee Counties, North Carolina; (3) approximately 6 miles of Fork Creek and Deep River in Randolph and Moore Counties, North Carolina.

(See "Regulation Promulgation" section for this proposed rule for the precise description of critical habitat.) These stream sections contain gravel, cobble, and boulder substrates with pools, riffles, and shallow runs for adult fish and slackwater areas with large rock outcrops and side channels and pools for juveniles. These areas also provide water of good quality with relatively low silt loads.

Section 4(b)(8) requires, for any proposed or final regulation that designates critical habitat, a brief description and evaluation of those activities (public or private) that may adversely modify such habitat or may be affected by such designation. Activities which presently occur within the designated critical habitat include, in part, fishing, boating, scientific research, and nature study. These activities, at their present use level, do not appear to be adversely impacting the area.

There are also Federal activities that do or could occur within the Deep River Basin and that may be affected by protection of critical habitat. These activities include, construction of impoundments (in particular, U.S. Army Corps of Engineers reservoirs under study for the upper Deep River), stream alterations, bridge and road construction, and discharges of municipal and industrial wastes, and hydroelectric facilities. These activities could, if not carried out with the protection of the species in mind, degrade the water and substrate quality of the Deep River, Rocky River, Bear Creek, and Fork Creek by increasing siltation, water temperatures, organic pollutants, and extremes in water flow. If any of these activities may affect the critical habitat area and are the result of a Federal action, section 7(a)(2) of the Act, as amended, requires the agency to consult with the Service to ensure that actions they authorize, fund, or carry out, are not likely to destroy or adversely modify critical habitat.

Section 4(b)(2) of the Act requires the Service to consider economic and other impacts of designating a particular area as critical habitat. The Service will consider the critical habitat designation in light of all additional relevant information obtained at the time of final rule.

Available to Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to it critical habitat, if any is being proposed or designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402 (see revision at 51 FR 19926; June 3, 1986). Section 7(a)(4) requires Federal agencies to confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat. If a species is subsequently listed, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service. The Service is presently aware of only two Federal actions under consideration (Randleman and Howards Mill Reservoirs) that may affect the species and the proposed critical habitat. The Service has been in contact with the U.S. Army Corps of Engineers concerning the potential impacts of these projects on the species and its habitat. The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to prossess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions would apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. In some instances, permits may be issued during a specified period of time to relieve undue economic hardship that would be suffered if such relief were not available.

Ref.22

Public Comments Solicited

The Service intends that any final action from this proposal will be as accurate and as effective as possible. Therefore, any comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning any aspect of this proposal are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to this species;

(2) The location of any additional populations of this species and the reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional information concerning the range and distribution of this species;

(4) current or planned activities in the subject area and their possible impacts on this species; and

(5) Any foreseeable economic and other impacts resulting from the proposed designation of critical habitat.

Final promulgation of the regulations on this species will take into consideration the comments and any additional information received by the Service, and such communications may lead to adoption of a final regulation that differs from this proposal.

The Endangered Species Act provides for a public hearing on this proposal, if requested. Requests must be filed within 45 days of the date of the proposal. Such requests must be made in writing and addressed to the Endangered Species Field Office, 100 Otis Street, Room 224, Asheville, North Carolina 28801.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

North Carolina Department of Natural Resources and Community Development. 1983. Status of Water Resources in the Cape Fear River Basin. 135 pp.

Pottern, G.B., and M.T. Huish. 1985. Status survey of the Cape Fear shiner (*Notropis mekistocholas*). U.S. Fish and Wildlife Service Contract No. 14-16-0009-1522. 44 pp.

Pottern, G.B., and M.T. Huish. 1988. Supplement to the status survey of the Cape Fear shiner (*Notropis mekistocholas*). U.S. Fish and Wildlife Service Contract No. 14-16-0009-1522. 11 pp.

Snelson, F.F. 1971. *Notropis mekistocholas*, a new cyprinid fish endemic to the Cape Fear River basin, North Carolina. Copeia 1971:449-462.

Author

The primary author of this proposed rule is Richard G. Biggins, Endangered Species Field Office, 100 Otis Street, Room 224, Asheville, North Carolina 28801 (704/259-0321 or FTS 672-0321).

List of Subjects in 50 CFR Part 17

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

Proposed Regulations Promulgation.

PART 17—[AMENDED]

Accordingly, it is hereby proposed to amend Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, as set forth below:

1. The authority citation for Part 17 continues to read as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. It is proposed to amend § 17.11(h) by adding the following, in alphabetical order under "FISHES," to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
FISHES							
Shiner, Cape Fear	*Notropis mekistocholas*	U.S.A. (NC)	Entire	E		17.95(e)	NA

3. It is further proposed to amend § 17.95(e) by adding critical habitat of the "Cape Fear shiner," in the same alphabetical order as the species occurs in § 17.11(h).

§ 17.95 Critical habitat—fish and wildlife.

(e) * * *

* * * * *

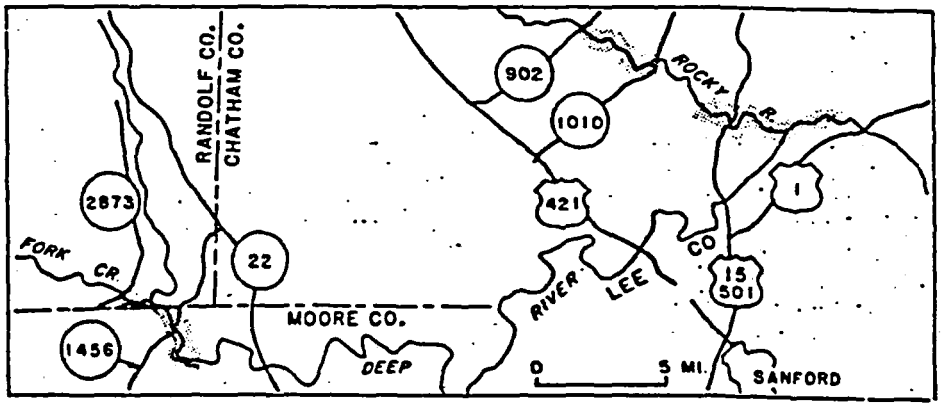
Cape Fear Shiner

(Notropis mekistocholas)

(1) *North Carolina.* Chatham County. Approximately 4.1 miles of the Rocky River from North Carolina State Highway 902 Bridge downstream to Chatham County Road 1010 Bridge;

(2) *North Carolina.* Chatham and Lee Counties. Approximately 0.5 miles of Bear Creek, from Chatham County Road 2156 Bridge downstream to the Rocky River, then downstream in the Rocky River (approximately 4.2 miles) to the Deep River, then downstream in the Deep River (approximately 2.6) in Chatham and Lee Counties, to a point 0.3 river miles below the Moncure, North Carolina, U.S. Geological Survey Gaging Station; and

(3) *North Carolina.* Randolph and Moore Counties. Approximately 1.5 miles of Fork Creek, from a point 0.1 creek miles upstream of Randolph County Road 2873 Bridge downstream to the Deep River then downstream appoximately 4.1 miles to the Deep River in Randolph and Moore Counties, North Carolina, to a point 2.5 river miles below Moore County Road 1456 Bridge.



Ref.22

Constituent elements include clean streams with gravel, cobble, and boulder substrates with pools, riffles, shallow runs and slackwater areas with large rock outcrops and side channels and pools with water of good quality with relatively low silt loads.

* * * * *

Dated: May 30, 1986.

Daniel Smith,

Acting Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 86-15643 Filed 7-10-86; 8:45 am]

BILLING CODE 4310-55-M

Ref.23

FARM CHEMICALS HANDBOOK

'82

Pesticide Dictionary

Buyer's Guide

Application Equipment

Plant Food Dictionary

Fertilizer Trade Names

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Phillip E. Jeanot
Circulation Director

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MAIN OFFICE

Willoughby, OH 44094
37841 Euclid Ave.
216-942-2000

REGIONAL OFFICES

Chicago, IL 60630
Wayne P. Larsen
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312-282-0909

Memphis, TN 38117
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4646 Poplar Ave., #320
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FARM CHEMICALS HANDBOOK is published annually by FARM CHEMICALS magazine and is a directory and reference primarily for the fertilizer and pesticide industries. Price for individual copies is $37.00 each. It has a paid circulation to management, marketing and production personnel as well as others interested in the production and use of fertilizers and pesticides.

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Ref.23

1982 FARM CHEMICALS HANDBOOK

68th Year of Publication

FOR 68 years, the FARM CHEMICALS HANDBOOK has been providing the farm chemicals industry the most complete reference available on fertilizers and crop protection chemicals and their application. You'll find this issue packed with details on new products, new clearances, new formulations, new company names, plus the latest consumption figures. *All* listings have been updated.

Key to the use of the HANDBOOK is the Index to the Pesticide Dictionary, Buyer's Guide, and Plant Food Dictionary. This section is printed on yellow pages for quick identification and is cross-referenced by trade name and common name wherever possible. Looking for a supplier of proportioning pumps? Check the Index and it will give you the page location in the Buyer's Guide. Need information on glyphosate? The Index will give you the trade name (Roundup*) and where to find it in the Pesticide Dictionary and Buyer's Guide. Want to know the amount of anhydrous ammonia produced in the U.S.? Check the Index for the exact page location in the Plant Food Dictionary.

There is one other Index that will provide a valuable reference—the Advertisers Index on page G 13.

In a huge undertaking of this kind, in which we endeavor to list all the products in the farm chemicals industry, there are bound to be omissions and errors. For these, we ask our readers' forgiveness and pledge our best efforts to produce as accurate and reliable a publication as it is possible to do.

Without the cooperation of all of you who have assisted in the preparation of the HANDBOOK by filling out forms and providing complete information on your products, the HANDBOOK would be an impossible task. We thank you for your assistance.

Editorial Director

Banvel *

CHEMICAL NAME: 2-Methoxy-3, 6-dichlorobenzoic acid, or 3, 6-Dichloro-*o*-anisic acid.

COMMON NAMES: *dianat* (USSR), *dicamba*.

OTHER NAMES: *Banex* *, *Banvel II* *, *Banvel D* *, *Brush Buster* *, *mediben*.

ACTION: Herbicide.

CHEMICAL PROPERTIES: Melting point 114-116° C.

TOXICITY: Acute oral LD_{50} (rat), 1707-2900 mg/kg (technical); 2629 mg/kg (*DMA* salt); 6764 mg/kg (sodium salt). Acute dermal LD_{50} (rabbit), > 2000 mg/kg (technical and *DMA* salt); >20,000 mg/kg (sodium salt).

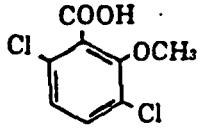
SIGNAL WORD: CAUTION.

ANTIDOTE: Not specific; if swallowed, drink water and induce emesis.

APPLICATIONS: For control of both annual and perennial broadleaf weeds in field and silage corn, grain sorghum, small grains (not underseeded to legumes), asparagus, grass seed crops, turf, pasture, rangeland and noncropland areas such as fence rows, roadways and wasteland. Also for control of brush and vines in noncropland, pasture, and rangeland areas. Approved tolerance for grass is 40 ppm and for milk .05 ppm. *Banvel* * has been approved for spot treatment of perennial broadleaf weeds in cropland to be rotated to wheat. *Banvel* * has also been approved for between cropping systems uses.

FORMULATION: Dimethylamine salt in water containing 4 pounds/gallon acid equivalent; oil soluble, 4 pounds/gallon; granular 5% and 10%. *Banvel II* * is the sodium salt containing 2 pounds/gallon acid equivalent.

COMBINATIONS: Formulations are available containing *Banvel* * in combination with *2,4-D* and *2,4,5-T* amine and low volatile ester; also with *benazolin* and *MCPA*. Labeling provides for tank mixes with *atrazine*, *bromoxynil*, *Lasso* *, *MCPA* and *2,4,5-T*. For premix combinations, see *Banvel K* *, *MonDak* *, *Weedmaster* *.



Dicamba

BP: Velsicol Chemical Corp. (*Brush Buster* *)

Ref.23

CHEMICAL NAME: 2,4-Dichlorophenoxyacetic acid.

COMMON NAME: *2,4-D.*

OTHER NAMES: *Agrotect* * (Miller Chemical & Fertilizer), *Amidox* * (discontinued by Union Carbide Australia), *Amoxone, Aqua-Kleen* *, *BH* * *2,4-D, Brush-Rhap* * (discontinued by Vertac), *Chipco Turf Herbicide "D"* *, *Chloroxone* *, *Crop Rider* *, *2,4-D* *, *D50* * (Shell Chemicals U.K.), *Dacamine* *, *Débroussaillant 600* *, *Ded-Weed* *, *Desormone* * (Union Carbide), *Dicotox* * (discontinued by Union Carbide Australia), *Dinoxol* * (Union Carbide), *DMA* * *4, Dormone* *, *Emulsamine* * *BK* (Union Carbide), *Emulsamine* * *E-3* (Union Carbide), *Envert* * *DT* (Union Carbide), *Envert* * *171* (Union Carbide), *Esteron* * *99 Concentrate, Esteron* * *Four, Esteron* * *Brush Killer, Estone* *, (*Fernesta* *, *Fernimine* *, *Fernoxone* * are ICI Plant Protection Div. trade names), *Ferxone* * (Atul), *Formula 40* *, *Hedonal* *, *Herbidal* *, *Lawn-Keep* *, *Macondray* *, *Miracle* *, *Nétagrone* * *600, Pennamine* * *D* (Pennwalt), *Planotox* * (May & Baker), *Plantgard* *, *Rhodia* *, *Salvo* * (Crystal Chemical), *Spritz-Hormin/2,4-D, Spritz-Hormit/2,4-D, Superormone Concentre* *, *Super D Weedone* * (Union Carbide), *Transamine* *, *Tributon* *, *U 46* *, *U 46 D-Ester* *, *U 46 D-Fluid* *, *Vergemaster* * (discontinued by Diamond Shamrock Agrochemicals Ltd.), *Verton* * *2D* (discontinued by Dow Chemical), Visko-Rhap *, *Weed-B-Gon* * (Chevron), *Weedar* *, *Weedatul, Weedone* * (Union Carbide), *Weed-Rhap* *, *Weed Tox, Weedtrol* *.

FORMER TRADE NAMES: *Weed-Ag-Bar* * and *Weedez Wonder Bar* *.

ACTION: Selective herbicide.

CHEMICAL PROPERTIES: White powder melting at 140.5° C. Only slightly soluble in water and petroleum distillate; soluble in alcohols. The acid is not used customarily by itself, usually as an amine, a salt or an ester.

TOXICITY: Acute LD_{50} (rat), 370 mg (acid)/kg; 500-1200 mg(esters)/kg; 300-1200 mg (amines)/kg; 666-875 mg (sodium salt)/ kg. At usual application rates *2,4-D* has no adverse effect on soil microorganisms.

SIGNAL WORD: CAUTION.

ANTIDOTE: Treat symptomatically. Remove poison by inducing vomiting.

FIRST AID TREATMENT: Skin — Flush with plenty of water, remove contaminated clothing and clean before reuse. Get medical attention if any irritation develops. Eyes — Flush with plenty of water. Get medical attention.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food or feed by storage or disposal of this product. Do not store near other agrochemicals or seeds. Do not use spray equipment contaminated with this product for any other purposes unless thoroughly cleaned with a suitable cleaner.

CAUTION: The greatest danger to susceptible crops when *2,4-D* is used, is spray drift and volatilization. Highly volatile esters may result in vapor damage to such crops while low volatile esters such as propylene glycol butyl ether ester are less likely to cause damage and salt formations are essentially non-volatile. Do not apply where irrigation water may be contaminated with *2,4-D.*

APPLICATIONS: Registered for use on grasses, wheat, barley, oats, sorghum, corn, sugarcane and noncrop areas for postemergent control of weeds such as Canada thistle, dandelion, annual mustards, ragweed, and lambsquarters. Certain formulations are registered for pine release, waterhyacinth control and prevention of seed formation. Many broadleaf crops are extremely sensitive, such as cotton and grape vines.

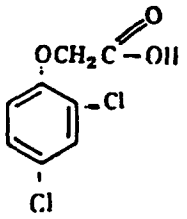
FORMULATIONS: Sodium salts of *2,4-D* are applied as soluble powders; amine salts are soluble in water; esters are soluble in oils, hence are generally in form of an emulsion when applied. Formulations usually bear declared content in pounds acid equivalent (a.i.) per gallon.

The amine in largest production is the dimethylamine salt, others being the diethanolamine, trimethylamine, etc. Trade name products include *Amoxone* * (triethanolamine), *Dacamine* * (oleyl propylenediamine), *DMA* * *4* (dimethylamine), *Ded-Weed* *, *Emulsamine* * *E-3* (a mixture of dodecylamine and tetradodecylamine), *Fernimine* *, *Formula 40* * (ethanol and isopropyl series), *Hedonal* *, *Pennamine* * *D* (heptylamine), *Weedar* *, *Weed- Rhap* *.

As with amines which form salts with the *2,4-D* acid, the esters are made with a wide variety of alcohols. Examples are: *Rhodia 2,4-D Low Volatile Ester 4L* * and *SULV* (contain *2,4-D* isooctylester), *Rhodia 2,4-D Butyl Ester 6E* and *Esteron* * *76BE* (butyl ester), *Esteron* * *99 Concentrate* (propylene glycol butyl ether ester), *Estone* * (ethyl ester), *Hedonal* * (isooctyl ester), *Weedone* * *LV4* (butoxy ethanol ester), *Planotox* * (butoxyethyl ester), *Weed Rhap* * *2,4-D*-ethyl hexyl ester.

COMBINATIONS: *Mad* * is a mixture of *MSMA* with *2,4-D* as a liquid suspension. *2,4-D* and *2,4,5-T* are combined in a variety of esters, under such names as *Esteron* * *Brush Killer, Brush-Rhap LV 2D-2T* *, *Ded-Weed* * *SULV Amine* (TH Agriculture & Nutrition Co.), *Rhodia Low Volatile Brush Killer No.2,* and *Visko- Rhap Low Volatile Ester 1D-1T* *. Also *2,4-D* and *2,4,5-T* mixed with *Banvel* *; *2,4-D* with *benazolin; Chipco Turf Kleen* * *(2,4-D + MCPP).*

See *Lithate* * *2,4-D* for lithium salt.



2,4-D

BP: Akzo Zout Chemie Nederland BV (The Netherlands)
All India Medical Corp. (India) (*Weed Tox*)
Agchem Manufacturing Corp. (Philippines) (*Miracle* *, *Weedtrol* *)
"Atanor" Sociedad Anomina Mixta (Argentina)
The Atul Products Ltd. (India) (*Weedatul*)
BASF Aktiengesellschaft (Federal Republic of Germany) (*U 46* *, *U 46 D-Ester* *, *U 46 D-Fluid* *)
Bayer AG (Federal Republic of Germany) (*Hedonal* *)
Compañia Quimica S.A. (Argentina)
Crewe Chemicals Ltd. (Great Britain)
Diamond Shamrock
Diamond Shamrock Agrochemicals Ltd. (Great Britain) (*BH* * *2,4-D, Dormone* *)
The Dow Chemical Co. (*DMA* * *4, Esteron* *, *Formula 40* *)
A.H. Marks & Co., Ltd. (Great Britain)
Nissan Chemical Industries, Ltd. (Japan) (*2,4-D* *)
Rhone-Poulenc Chemical Co., Agrochemical Div. (*Chipco Turf Herbicide "D"* *, *Chipco Turf Kleen* *, *Rhodia* *, *Visko-Rhap* *)
Rhone-Poulenc (France) (*Débroussaillant 600* *, *Desormone* *, *Herbidal* *, *Nétagrone 600* *, *Superormone* *)
TH Agriculture & Nutrition Co., Inc. (*Ded-Weed* *)
Ugimica, S.A. (Spain)
VEB Chemiekombinat Bitterfeld (GDR) (*Spritz-Hormin/2,4-D, Spritz Hormit/2,4-D*)
Vertac Chemical Corp. (*Transamine* *, *Weed-Rhap* *)
F: Devidayal (Sales) Private Ltd. (India)

Mecoprop

CHEMICAL NAME: 2-(4-Chloro-2-methylphenoxy) propanoic acid.

COMMON NAMES: *MCPP, mecoprop* (BSI, CSA, ISO, WSSA), *CMPP*.

OTHER NAMES: *BH* Mecoprop, Chipco Turf Herbicide MCPP*, Compitox** and *Compitox Plus* (May and Baker), *Hedonal* MCPP, Iso-Cornox*, Kilprop*, Mecomec** (PBI/Gordon), *Mepro*, Methoxone*, Propal*, Proponex-Plus** (Shell Chemicals U.K.), *U 46*, U 46 KV-Ester*, U 46 KV-Fluid**.

ACTION: Systemic herbicide.

CHEMICAL PROPERTIES: Colorless crystals melting at 94-95° C. Solubility in water at 20° C is only 620 ppm. Readily soluble in most organic solvents.

TOXICITY: Acute oral LD_{50} (rat), 930 mg/kg; (mouse), 650 mg/kg.

SIGNAL WORD: CAUTION.

ANTIDOTE: None. Remove poison by inducing vomiting.

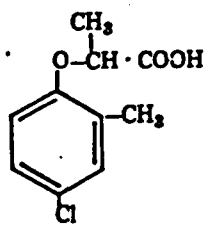
HANDLING AND STORAGE CAUTIONS: Solutions of the salt of *MCPP* are stable for several years under normal storage conditions. At low temperatures the salt will crystallize out of solution, but the crystals will redissolve on warming.

APPLICATIONS: Registered for use on sports and ornamental turf for selective control of surface-creeping broadleaf weeds such as red and white clovers, chickweed, knotweed, plantain, dandelion and ground ivy and in cereals, alone or in admixture with other plant growth regulators, e.g. *2,4-D*, for the control of chickweed, cleavers, etc.

FORMULATIONS: Diethanolamine salt (*Mecopar*, Chipco Turf Herbicide MCPP**), dimethylamine salt (*U 46**); potassium salt (*Mecopex*, Hedonal* MCPP, U 46**). Butyl and isooctyl esters.

COMBINATION: With *bentazon: Basagran-KV* (BASF); with *2,4-D* (Cleary).

See *Methoxone**.



Mecoprop

BP: Akzo Zout Chemie Nederland BV (The Netherlands)
BASF Aktiengesellschaft (Federal Republic of Germany) (*U 46 KV-Ester*, U 46 KV-Fluid*, Basagran-KV**)
Bayer AG (Federal Republic of Germany) (*Hedonal* MCPP*)
W.A. Cleary Corp.
Crewe Chemicals Ltd. (Great Britain) (*MCPP*)
Diamond Shamrock
Diamond Shamrock Agrochemicals Ltd. (Great Britain) (*BH* Mecoprop**)
FBC Limited (Great Britain) (*Iso-Cornox**)
A.H. Marks & Co., Ltd. (Great Britain)
Rhone-Poulenc Chemical Co., Agrochemical Div. (*Chipco Turf Herbicide MCPP*)
Universal Crop Protection Ltd. (Great Britain) (*Propal**)

Ref.24

Dangerous Properties of Industrial Materials

Sixth Edition

N. IRVING SAX

Assisted by:

Benjamin Feiner/Joseph J. Fitzgerald/Thomas J. Haley/Elizabeth K. Weisburger

4-9-85 $198.00 S/AW (2.C.)

WA 440 S29d 1984 c.2

VAN NOSTRAND REINHOLD COMPANY
New York

4-CHLORO-2-METHYLPHENOXY-alpha-PROPIONIC ACID

CAS RN: 93652 NIOSH #: UE 9750000
mf: $C_{10}H_{11}ClO_3$; mw: 214.66

SYNS:

ACIDE 2-(4-CHLORO-2-METHYL-PHENOXY)PROPIONIQUE (FRENCH)
ACIDO 2-(4-CLORO-2-METIL-FEN-OSSI)-PROPIONICO (ITALIAN)
2-(4-CHLOOR-2-METHYL-FEN OXY)-PROPIONZUUR (DUTCH)
2-(4-CHLOR-2-METHYL-PHEN-OXY)-PROPIONSAEURE (GER-MAN)
(+)-ALPHA-(4-CHLORO-2-METHYLPHENOXY) PROPIONIC ACID
2-(4-CHLORO-2-METHYLPHEN-OXY)PROPIONIC ACID
2-(4-CHLOROPHENOXY-2-METHYL)PROPIONIC ACID
2-(P-CHLORO-O-TOLYLOXY)PRO-PIONIC ACID
ALPHA-(2-METHYL-4-CHLORO-PHENOXY)PROPIONIC ACID
2-(2-METHYL-4-CHLOROPHEN-OXY)PROPIONIC ACID
2-METHYL-4-CHLOROPHENOXY-ALPHA-PROPIONIC ACID

TOXICITY DATA: 2

mrc-smc 742 ppm
dns-mus-orl 100 mg/kg
orl-rat LD50:650 mg/kg
ipr-rat LD50:402 mg/kg
orl-mus LD50:650 mg/kg
unk-mus LD50:650 mg/kg
skn-rbt LD50:900 mg/kg

CODEN:

MUREAV 21,83,73
MUREAV 55,197,78
WRPCA2 9,119,70
TXCYAC 3,349,75
FMCHA2 -,D191,80
30ZDA9 -,172,71
PCOC** -,683,66

Toxicology Review: DTTIAF 80(20),485,73. Reported in EPA TSCA Inventory, 1980.
THR: MUT data. MOD orl, ipr, skn, unk.
Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

DICHLOROPHENOXYACETIC ACID

CAS RN: 94757 NIOSH #: AG 6825000
mf: $C_8H_6Cl_2O_3$; mw: 221.04

Ref.24

White powder. mp: 141°; bp: 160° @ 0.4 mm; vap d: 7.63.

SYNS:

ACIDE 2,4-DICHLORO PHENOXY-ACETIQUE (FRENCH)
ACIDO (2,4-DICLORO-FENOSSI)-ACETICO (ITALIAN)
2,4-D ACID
(2,4-DICHLOOR-FENOXY)-AZIJNZUUR (DUTCH)
2,4-DICHLORPHENOXYACETIC ACID
(2,4-DICHLOR-PHENOXY)-ESSIGSAEURE (GERMAN)

TOXICITY DATA: 3	CODEN:
dnr-esc 5 mg/disc	NTIS** PB80-133226
dnr-bcs 5 mg/disc	NTIS** PB80-133226
orl-rat TDLo:400 mg/kg (7-14D preg)	GISAAA 41(11),102,76
scu-mus TDLo:884 mg/kg/(12-15D preg) TFX:TER	AECTCV 6,33,77
orl-mus TDLo:900 mg/kg (6-14D preg)	NTIS** PB223-160
scu-mus TDLo:882 mg/kg (6-14D preg)	NTIS** PB223-160
scu-mus TDLo:900 mg/kg (6-14D preg)	NTIS** PB223-160
orl-ham TDLo:200 mg/kg (7-11D preg)	BECTA6 6,599,67
orl-hmn LDLo:80 mg/kg	ARPAAQ 94,270,72
sln-dmg-orl 1000 ppm/15D	MUREAV 65,83,79
mrc-smc 300 mg/L/3H	MUREAV 42,3,77
mma-hmn:fbr 1 umol/L	MUREAV 42,161,77
dns-hmn:fbr 1 umol/L	MUREAV 42,161,77
cyt-hmn:lym 20 ug/L	TGANAK 8(3),202,74
dns-mus-orl 200 mg/kg	MUREAV 55,197,78
cyt-mus-orl 100 mg/kg	TGANAK 8(3),202,74
dnd-mam:lym 1 mmol/L	PYTCAS 11,3135,72
orl-rat TDLo:1 gm/kg (6-15D preg)	TXAPA9 22,14,72
orl-mus TDLo:707 mg/kg (11-14D preg)	AECTCV 6,33,77
ihl-man TCLo:10 mg/m3:CNS	GISAAA 31,28,66
orl-hmn LD50:80 mg/kg	ARPAAQ 94,270,72
ihl-man TCLo:10 mg/m3:GIT	GISAAA 31,28,66
orl-rat LD50:370 mg/kg	FMCHA2 -,D88,80
skn-rat LD50:1500 mg/kg	WRPCA2 9,119,70
ipr-rat LDLo:666 mg/kg	JIHTAB 29,85,47
orl-mus LD50:368 mg/kg	AJVRAH 15,622,54
ipr-mus LDLo:125 mg/kg	TXAPA9 23,288,72
orl-dog LD50:100 mg/kg	AEHLAU 7,202,63
orl-rbt LDLo:800 mg/kg	AMPMAR 12,26,51
skn-rbt LD50:1400 mg/kg	AFDOAQ 16,3,52
ipr-rbt LDLo:400 mg/kg	JIHTAB 29,85,47
ivn-rbt LDLo:400 mg/kg	JIHTAB 29,85,47
orl-gpg LD50:469 mg/kg	AJVRAH 15,622,54
ipr-gpg LDLo:666 mg/kg	JIHTAB 29,85,47
orl-ham LD50:500 mg/kg	TXAPA9 48,A192,79
orl-ckn LD50:541 mg/kg	AJVRAH 15,622,54
orl-mam LD50:375 mg/kg	SCIEAS 165,465,69

Aquatic Toxicity Rating: TLm96:10-1 ppm WQCHM* 2,-,74. Carcinogenic Determination: Animal Suspected IARC** 15,111,77.

TLV: Air: 10 mg/m3 DTLVS* 4,117,80. *Toxicology Review:* RREVAH 59,1,75; DTTIAF 80(20),485,73; RREVAH 56,107,75; ECMAAI 14(3),141,73; BIOGAL 40(2),44,74. OSHA Standard: Air: TWA 10 mg/m3 (SCP-T) FEREAC 39,23540,74. DOT-ORM-A, Label: None FEREAC 41,57018,76. "NIOSH Manual of Analytical Methods" VOL 5 S279#. Reported in EPA TSCA Inventory, 1980.

THR: MUT data. An exper TER and susp CARC. A hmn CNS, GIT. HIGH orl, ivn, ipr, scu. MOD orl ipr, skn. Ingest can cause nausea, vomiting and CNS depression. Liver and kidney injury have been reported in expers. An herbicide.

Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

Ref.24

2-METHOXY-3,6-DICHLOROBENZOIC ACID

CAS RN: 1918009 NIOSH #: DG 7525000
mf: $C_8H_6Cl_2O_3$; mw: 221.04

SYNS:

ACIDO (3,6-DICLORO-2-METOSSI)-BENZOICO (ITALIAN)
COMPOUND B DICAMBA
DIANAT (RUSSIAN)
3,6-DICHLOOR-2-METHOXY-BENZOEIZUUR (DUTCH)
3,6-DICHLOR-3-METHOXY-BENZOESAEURE (GERMAN)
3,6-DICHLORO-O-ANISIC ACID
2,5-DICHLORO-6-METHOXYBENZOIC ACID
3,6-DICHLORO-2-METHOXYBENZOIC ACID

TOXICITY DATA: 2	CODEN:
dnr-esc 5 mg/disc	NTIS** PB80-133226
dnr-bcs 5 mg/disc	NTIS** PB80-133226
orl-rat LD50:1040 mg/kg	RREVAH 10,97,65
orl-mus LD50:1190 mg/kg	HYSAAV 35,14,70
orl-rbt LD50:2000 mg/kg	HYSAAV 35,14,70
orl-gpg LD50:3000 mg/kg	HYSAAV 35,14,70
unk-mam LD50:1000 mg/kg	30ZDA9 -,147,71

Toxicology Review: DTTIAF 80(20),485,73.
THR: MOD orl, unk.
Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

Appendix D

Site Inspection Form

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D000828616

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
USS Agri Chemicals Farm Service	Hwy. 701, Route 3, Box 212

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Whiteville	NC	28472	Columbus	24	7

09 COORDINATES: LATITUDE 34° 14' 52.0" LONGITUDE 78° 45' 18.0"

10 TYPE OF OWNERSHIP (Check one): [X] A. PRIVATE [ ] B. FEDERAL [ ] C. STATE [ ] D. COUNTY [ ] E. MUNICIPAL [ ] F. OTHER [ ] G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 07/16/86 (MONTH DAY YEAR)

02 SITE STATUS: [ ] ACTIVE [X] INACTIVE

03 YEARS OF OPERATION: 1962 (BEGINNING YEAR) | Present (ENDING YEAR) [ ] UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): [ ] A. EPA [ ] B. EPA CONTRACTOR (Name of firm) [ ] C. MUNICIPAL [ ] D. MUNICIPAL CONTRACTOR (Name of firm) [X] E. STATE [ ] F. STATE CONTRACTOR (Name of firm) [ ] G. OTHER (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Jack Butler	Env. Engineer	NC DHR/DHS	(919) 733-2801

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Stan Atwood	Toxicologist	NC DHR/DHS	(919) 733-2801
Grover Nicholson	Geologist	NC DHR/DHS	(919) 733-2801
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Mr. L.E. Watts	Co-Owner	Watts Farm Center Hwy. 70, Rt.3, Box 212 Whiteville, NC 28472	(919) 642-4006
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
[X] PERMISSION [ ] WARRANT	10:30-12:00 noon	Increasing clouds, rain, hot.

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Mr. L.E. Watts	Watts Farm Center	(919) 642-4006

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Jack Butler	NC DHR/DHS	SHW Mgmt. Br.	(919) 733-2801	08/22/86 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D000828616

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [x] A. SOLID
- [ ] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER _____ (Specify)
- [ ] E. SLURRY
- [ ] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS 1.3
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- [x] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [x] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	35	cubic ft.	Fertilizer residue containing
IOC	INORGANIC CHEMICALS			2,4-D buried on site.
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OCC	2,4-Dichlorophenoxyacetic	94757	Burial on site	Unknown	
	Acid				
OCC	MCPP	---	" " "	"	
OCC	Dicamba	1918009	" " "	"	
OCC	2,4-DB	---	" " "	"	
OCC	Silex	93721	" " "	"	
OCC	2,4,5-T	93765	" " "	"	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

1. Permanent files, NC Solid and Hazardous Waste Mgmt. Branch, Raleigh, NC.
2. USGS, 7.5' Quad., Tabor City East Quadrangle, 1962.
3. Telephone conversation between Jack Butler, SHW Mgmt. Branch, and Tommy Blackman, Watts Farm Center, on December 5, 1985.
4. Telephone conversation between Jack Butler, SHW Mgmt. Branch, and L.E. Watts, Watts Farm Center on December 5, 1986.
5. Summary Trip Report to Denise Bland, EPA NC CERCLA Project Officer, 17 July 1986.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: Unknown (Acres)
02 ☒ OBSERVED (DATE: 1980) ☐ POTENTIAL ☒ ALLEGED
04 NARRATIVE DESCRIPTION

Burial of about 35 cubic feet of fertilizer residue containing 2,4-D on site in 1980.

01 ☐ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/Runoff/Standing liquids, Leaking drums)* — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE: 1980) — ☐ POTENTIAL — ☒ ALLEGED
04 NARRATIVE DESCRIPTION

Burial of about 35 cubic feet of fertilizer residue containing 2,4-D on site in 1980.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D000828616

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☒ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	approx. 35	cubic ft.
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

- ☒ A. BUILDINGS ON SITE

06 AREA OF SITE

approx. 2 (Acres)

07 COMMENTS

Property used as Farm Supply Center. Burial of about 35 cubic feet of fertilizer residue containing 2,4-D on site in 1980. Fertilizer residue from used mixer.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☒ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

No containment. Material buried in unlined pit without containers.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS

Site is easily accessible however waste material is covered with soil.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D000828616

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. 4 (mi)
B. 0.07 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☒ A. ONLY SOURCE FOR DRINKING
☐ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)
☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available)
☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER ~1500 (< 3 miles)

03 DISTANCE TO NEAREST DRINKING WATER WELL Approx. 388 ft. 0.07 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
Approx. 5-10 (ft)	Unknown	Approx. 5-10 (ft)	Unknown (gpd)	☒ YES ☐ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Well on site serves Farm Center is approx. 50 - 60 ft. deep.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS	☐ YES ☐ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE
☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
☐ C. COMMERCIAL, INDUSTRIAL
☒ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Big Pond Branch	☐	0.7 (mi)
Beaverdam Swamp	☐	Approx. 1 (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 170 NO. OF PERSONS	B. 680 NO. OF PERSONS	C. 1500 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 5 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 180

04 DISTANCE TO NEAREST OFF-SITE BUILDING < 0.1 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Population within 1,2, and 3 miles calculated from 54 people/square mile (1980 census for Columbus County). Rural area. Nearest towns are Chadbourn and Whiteville which are approx. 5-6 miles from the site.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☒ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
600 - 700 (ft)	Unknown (ft)	Unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
6 - 10 (in)	3 - 3.5 (in)	0 %	---	< 1 %

09 FLOOD POTENTIAL

SITE IS IN --- YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. --- (mi)

OTHER: B. 0.7 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

~200 (mi)

ENDANGERED SPECIES: Mountain Golden Heather Hudsonia montana

13 LAND USE IN VICINITY.

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0 (mi)	B. < 1 (mi)	C. --- (mi)	D. < 1 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Terrain is very flat sand hills area of North Carolina. Site is agrichemical supply store. Surrounding area is rural.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	1	NC DHR/DHS Lab	
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL	2	NC DHR/DHS Lab	
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NC CERCLA Unit, DHR/DHS, Solid and Haz. Waste Mgmt. Branch, Raleigh, NC.
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS NC CERCLA Unit, DHR/DHS

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Hot and rainy on day of site inspection.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
Mr. L.E. Watts	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Hwy. 701, Route 3, Box 212	

05 CITY	06 STATE	07 ZIP CODE
Whiteville	NC	28472

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER
(Leased 1979-1985) United States Steel Corp.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
P.O. Box 1685	

05 CITY	06 STATE	07 ZIP CODE
Atlanta	GA	30301

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D000828616

II. CURRENT OPERATOR *(Provide if different from owner)*

01 NAME	02 D+B NUMBER
Watts Farm Service	

03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	04 SIC CODE
Hwy. 701, Rt. 3, Box 212	

05 CITY	06 STATE	07 ZIP CODE
Whiteville	NC	28472

08 YEARS OF OPERATION	09 NAME OF OWNER
1	L.E. Watts

OPERATOR'S PARENT COMPANY *(If applicable)*

10 NAME	11 D+B NUMBER

12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) *(List most recent first; provide only if different from owner)*

01 NAME	02 D+B NUMBER
USS Agri Chemicals	

03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	04 SIC CODE
Hwy. 701	

05 CITY	06 STATE	07 ZIP CODE
Whiteville	NC	28472

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
6	USS Agri Chemicals

PREVIOUS OPERATORS' PARENT COMPANIES *(If applicable)*

10 NAME	11 D+B NUMBER
United States Steel	

12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	13 SIC CODE
P.O. Box 1685	

14 CITY	15 STATE	16 ZIP CODE
Atlanta	GA	30301

01 NAME	02 D+B NUMBER

03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS *(P.O. Box, RFD #, etc.)*	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
USS Agri Chemicals	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Hwy. 701, Route 3, Box 212	

05 CITY	06 STATE	07 ZIP CODE
Whiteville	NC	28472

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☒ H. ON SITE BURIAL — 02 DATE 1980 — 03 AGENCY USS Agri Chemicals
04 DESCRIPTION

Burial of about 35 cubic feet of fertilizer residue containing 2,4-D.

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

None.

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

As previously cited.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D000828616

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

As previously cited.

Appendix E

Site Safety Plan

SITE SAFETY PLAN

A. GENERAL INFORMATION

Site Name USS Agri Chemical Farm Service
Site Number NC D000828616
Location Highway 701
Date 7/14/86
Whiteville, NC

Purpose of Visit ____ PA __X__ SI ____ Other

Proposed Date of Inspection 7/16/86

Date of Briefing 7/15/86

Priority Ranking ____ Low __X__ Medium ____ High

Site Investigation Team

Personnel	Responsibilities
Stan Atwood	sampling
Grover Nicholson	sampling
Jack Butler	sampling - no auger sampling

PLAN PREPARATION:
Prepared By Mary Giguere Mary Giguere

Approved By Lee Crosby

B. SITE/WASTE CHARACTERISTICS

Waste Type(s) ____ Liquid __X__ Solid ____ Sludge ____ Gas

Characteristics ____ Corrosive ____ Ignitable ____ Radioactive
____ Volatile __X__ Toxic ____ Reactive ____ Other

List Known or Suspected Hazards (physical,chemical biological or radioactive) on Site and their toxicological effects. Also, if known, list chemical amounts

HAZARD	EFFECT(S)
2,4-D	10 mg/m - TLV standard set by effects of ingestion

Facility Description: Size _____ Buildings one

Disposal Methods Being Investigated burial

Unusual Features on Site (dike integrity, power lines, terrain etc.):

History of the Site: Built in 1962, this warehouse was used to sell oil, kerosene, fertilizer, pesticides and agricultural chemicals until 1979. From 1979 until 1985 USS Agri Chemicals leased the site and sold pesticides and fertilizers. In 1985 the company changed hands and agricultural chemicals are still sold. In 1980 material was chipped out of a bulk mixer and buried on site. Approx. 35 cubic yds. of material thought to be fertilizer contaminated with 2,4-D was buried.

C. HAZARD EVALUATION

Sampling on this site is to consist of sampling drinking water wells, and sampling the substance that was buried on site. If the material buried is indeed 2,4-D contaminated fertilizer the sampling would not pose a problem, but because we are not positive the material is 2,4-D, respirators will need to be worn when collecting the auger sample. Resp. with pesticide cartridges will be worn. Tyvek, boots & gloves will also be worn.

D. WORK PLAN INSTRUCTION

Map or Sketch Attached? No
Perimeter Identified? No
Command Post Identified? No
Zones of Contamination Identified? No

Personal Protective Equipment

Level of Protection ____ A ____ B X C ____ D

Modifications Respirators with pesticide cartridges need only be worn when sampling the buried substance. Take plenty of cold water for drinking. Watch for symptoms of overheating.

Surveillance Equipment:

_____ H Nu
_____ Explosimeter
_____ TLD
_____ Detector Tubes and Pumps
_____ 02 Meter
_____ (Radiation Monitor)

Decontamination Procedures

_____ Level A Segregated equipment drop, boot cover and glove wash, boot cover and glove rinse, tape removal, suit and hard hat removal, SCBA backpack removal, inner glove wash, inner glove removal, inner clothing removal, field wash, redress

_____ Level B Segregated equipment drop, boot cover and glove wash,boot cover and glove rinse, tape removal. boot cover removal outer glove removal, suit/safety removal, SCBA backpack removal, inner glove wash, inner glove rinse, facepiece removal, inner glove removal, inner clothing removal, field wash, redress.

__X__ Level C Segregated equipment drop, boot cover and glove wash, boot cover and glove rinse, tape removal, boot cover removal, outer glove removal,suit/safety boot wash, suit/safety boot rinse (Canister or Mask Change), safety boot removal, splash suit removal, inner glove wash, inner glove rinse, facepiece removal, inner glove removal, inner clothing removal. field wash redress.

__X__ Level D Segregated equipment drop. boot and glove wash, boot and glove rinse.

Modifications _____

Work Schedule/ Limitations auger sample in the burial area and private drinking water wells.

EMERGENCY PRECAUTIONS

Acute Exposure Symptoms	First Aid
eyes	irrigate immediately
skin	soap and water wash
inhalation	fresh air and artificial resp.
ingestion	medical attention

Hospital (Address and Phone Number)

Columbus County Hospital 642-8011

Jefferson Street

Emergency Transportation Systems (Phone Numbers)

Fire use 911

Ambulance use 911

Rescue Squad use 911

Emergency Route to Hospital Take 701 North towards Whiteville, when Bus. & Byp. 701 split take Business 701. Bus. 701 comes into the town square, go right on Jefferson, hospital will be on the rt. in 2 - 3 blocks.

PREVAILING WEATHER CONDITIONS AND FORECAST hot and sunny with highs in the upper 90s.

EQUIPMENT CHECKLIST

X	Air purifying respirator	X	First Aid Kit
X	Cartridges for respirator	X	3 gal. Distilled H2O
	3M 8710 Respirator	X	Personal Protective Clothing
	02 Indicator	X	Boots or Boot Covers
	Detector Tube & Pump	X	Coveralls (tyvek)
X	Eye Wash Unit	X	Eye Protection
	H Nu		Hard Hat
	pH Meter	X	Decontamination Materials.
	Explosimeter		
	Radioactive Monitor		

Poison Control Center - State Coordinator

Duke University Medical Center
Telephone: 1-800-672-1697
Box 3024
Durham, NC 27710

ASHEVILLE 704-255-4490	Western NC Poison Control Center Memorial Mission Hosp. 509 Biltmore Ave. 28801	HENDERSONVILLE 704-693-6522 Ext. 555, 556	Margaret R. Pardee Memorial Hospital Fleming St., 28739
CHARLOTTE 704-379-5827	Mercy Hospital 2001 Vail Ave, 28207	HICKORY 704-322-6649	Catawba Mem. Hosp. Fairgrove Chur. Rd 28601
DURHAM 1-800-672-1697	Duke Univ Medical Center Box 3007, 27710	JACKSONVILLE 919-577-2555	Onslow Mem. Hospital Western Blvd. 28540
GREENSBORO 919-379-4105	Moses Cone Hospital 1200 N. Elm St, 27420	WILMINGTON 919-343-7046	New Hanover Mem. Hospital 2131 S. 17th St, 28401

1-800-722-2222

HAZARDOUS SUBSTANCE INFORMATION FORM

Common Name 2,4-D Chemical Name (2,4-Dichlorophenoxy) (Acetic Acid

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula C8 H6 C12)3	1,2,3,4
Natural Physical State at 25°C solid	1,2,3,4
Vapor Pressure ~ 0 mm Hg at 20°C	2,3
Melting Point 138 °F/°C Boiling Point 160 °F/°C	1,2
Flash Point (open or closed cup) ? °C/°F	3
Solubility - H_2O almost insoluble	1,2,3,4
Other organic solvents and alcohol	1,2,3,4

Physical Features: (odor, color, etc.) odorless, white to yellow crystalline powder

II. TOXICOLOGICAL DATA

Standards: 10 mg/m TLV 10 mg/m PEL 500 mg/m IDLH 3

Routes of Exposure: inhalation

Acute/Chronic Symptoms: irritation of throat and chest, weakness, loss of weight, twitching, convulsions, dermatitis (2,3).

First Aid: eyes: irrigate immediately, skin: soap wash immediately, inhalation: fresh air & artificial resp., ingestion: medical attention.

III. HAZARDOUS CHARACTERISTICS

Reference

A. Combustibility Yes ____ No X ____ _____

Toxic by-products _____ _____

_____ _____

B. Flammability LFL _____ UFL _____ _____

Explosivity LEL _____ UEL _____ _____

C. Reactivity Hazard strong oxidizers _____ 3 _____

_____

D. Corrosivity Hazard yes/no pH: _____ _____

Neutralizing agent: _____ _____

E. Radioactive Hazard Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

The Merck Index

Documentation of the TLVs

NIOSH Pocket Guide to Chemical Hazards

Farm Chemicals Handbook