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Division	Waste Management
Section	Superfund
Program	SERB (SERB)
DocCat	Facility

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

18 October 1989

Mr. Robert Morris
EPA NC CERCLA Project Officer
EPA Region IV Waste Division
345 Courtland Street, NE
Atlanta, GA 30365

Dear Mr. Morris:

SUBJECT: Site Investigation Report
Renroh, NCD980728687
Highway 50 and Lloyd Street
Holly Ridge, Onslow County, NC 28445

Enclosed please find the Site Investigation Report for the subject site. Due to the removal activity which has occurred at this site and the apparent lack of residual contaminant, no further action is recommended at this site at this time. If you have any questions, please contact me at (919) 733-2801.

Sincerely,

Jack Butler

Jack Butler, Environmental Engineer
Superfund Section
Solid Waste Management Division

JB/ds/renroh-8

Enclosure

NORTH CAROLINA

DEHNR/DSWM

Renroh
NCD980728687
Screening Site Investigation

October 1989

By: Jack Butler
Environmental Engineer
Superfund Section
Division of Solid Waste Management

Site Investigation Report

October 1989

Renroh
NCD980728687
Highway 50 and Lloyd Street
Holly Ridge, Onslow County, NC 28445

Prepared by:

Jack Butler
Environmental Engineer

Table of Contents

EXECUTIVE SUMMARY

The Renroh site is located at the corner of Highway 50 and Lloyd Street in Holly Ridge, NC. This is in Onslow County. The county code is 67 and this is in the third Congressional District.

In 1977 approximately 2,000 drums of 2,4-dinitrophenol were discovered in a dilapidated US Army gym in Holly Ridge, NC. This building was originally built in the early 1940's as part of Camp David. At the time of the discovery the building was owned by Doug Horner, Renroh, and was being used as a warehouse.

When discovered, the roof of the building had caved in and a number of the drums had broken open. In 1980 the drums were removed under a court order. Most of the drums were moved to Lackey Ind. Whse. (NCD080891039) in Whiteville, NC. Several hundred were reportedly sent to a Renroh warehouse in New Bern, American Cyanamide in Damascus, VA, and some were reportedly shipped to an unknown company in Taiwan. Approximately 100 drums from the Renroh site were discovered in a warehouse owned by Marlow Bostic, NCD982119554, on US 17 about 1 mile north of Holly Ridge.

After the drums were removed from the Renroh site, the property was owned for approximately one year by the City of Holly Ridge who sold it to Allen Hobbs in 1982. The dilapidated building has been removed and the site is presently a vacant lot. The concrete slab floor and fence that was erected around the building after the drum discovery remain on the site.

1.0 BACKGROUND

1.1 Site Location

The Renroh site is located at the corner of Highway 50 and Lloyd Street in Holly Ridge, NC (1). This is in Onslow County. The county code is 67 and this is in the third Congressional District. The coordinates of the site are: Latitude: 34° 29′ 51′; Longitude: 77° 33′ 22" (Map 1, Appendix A).

1.2 Site Layout

The Renroh site covers an area of approximately 2.5 acres (Figure 1, Appendix A). The site is presently a vacant lot. An approximately 140 ft. x 180 ft. concrete pad surrounded by 16 concrete columns is all that remains of the previous warehouse. A chain link fence surrounds this area. A second approximately 120 ft. square concrete area is located approximately 40 ft. east of the previous location of the warehouse. This area was reportedly used as a parking lot. The site is essentially flat (Figure 1, Appendix A).

1.3 Ownership and Site Use History

The former warehouse on this site was originally built in the early 1940's as part of Camp David. When the collapsing building was discovered in 1977 the site was owned by Doug Horner, Renroh, and was being used as a warehouse. In 1980 the drums were removed under a court order. After the drums were removed the property was owned for approximately one year by the City of Holly Ridge who sold it to Allen Hobbs in 1982. The dilapidated building has been removed and the site is presently a vacant lot (1).

1.4 Permit and Regulatory History

No environmental permits have been issued for this site.

1.5 Remedial Action to Date

In 1980 approximately 2,000 drums of 2,4-dinitrophenol were removed from the site under a court order (2,3). Most of the drums were moved to Lackey Ind. Warehouse (NCD080891039) in Whiteville, NC. Several hundred were reportedly sent to a Renroh warehouse in New Bern, American Cyanamide in Damascus, VA, and some were reportedly shipped to an unknown company in Taiwan. Approximately 100 drums from the Renroh site were discovered in a warehouse owned by Marlow Bostic, NCD982119554, on US 17 about 1 mile north of Holly Ridge (1). The warehouse was demolished and a chain link fence was erected around the site of the former warehouse (1).

1.6 Summary Trip Report

On August 8, 1989, Jack Butler and Ed Wallingford, NC Superfund Section performed a site investigation visit to the subject site. Mr. Les Haste and Mr. Sam Frazelle, Onslow County Health Department were also present during a portion of this visit. Surface soil samples were collected on the site (see Figure 1, Appendix A). No residential wells were observed in the immediate vicinity of the site (1).

2.0 ENVIRONMENTAL SETTING

2.1 Topography

The Renroh site is in the coastal plain of North Carolina and is located approximately 4 miles inland from the Atlantic Ocean. The site is essentially flat and approximately 65 feet above sea level (Map 1, Appendix A). Since the site slope is approximately 0%, there is no clear cut drainage pattern for the site. It is assumed that any runoff from the site collects in drainage ditches along U.S. 50 and Lloyd Street, but the flow direction in these ditches is not obvious.

2.2 Surface Water

As stated above, the drainage pattern at the Renroh site is not clear due to the flatness of the site. The general area of Holly Ridge slopes to the Southeast toward the Intercoastal Waterway and the Atlantic Ocean. The closest surface water is Cypress Branch approximately 0.5 miles southeast of the site. Cypress Branch joins with County Line Branch to form Batts Mill Creek approximately 2 miles south of the Renroh site. Batts Mill Creek enter the Intercoastal Waterway approximately 3 miles south of the site (Map 1, Appendix A). Batts Mills Creek, County Line Branch, and Cypress Branch are class SA waters in this area (4).

2.3 Geology, Soils, and Groundwater

The oldest formation penetrated by a water well in Onslow County is the Peedee. It is not known to crop out but lies within 30 feet of the surface in some valleys northwest of Richlands. Coastward the Peedee is more deeply buried, lying under a wedge of Castle Hayne limestone that thickens toward the cost. The Castle Hayne is exposed at many places along New River between Richlands and Jacksonville. Southwest Creek and White Oak River are other streams whose channels lie in the limestone in the northern part of the county. The Yorktown formation overlies the Castle Hayne, but it has been eroded away in parts of the county north of Jacksonville. Along the coast the Yorktown reaches a thickness of about 60 feet but inland it is thinner. The Yorktown is exposed in several ravines near Silverdale and occurs within 60 feet of the surface in several wells at Camp Lejeune. A thin layer of sand and clay, chiefly sand, of Pleistocene age conceals the older formations in the interstream areas (5).

Three main aquifers furnish water to wells in Onslow County. These are the surficial sands, the sands of the Peedee, and the Teriary limestone unit (5).

The surficial sand covers the entire county to a depth generally ranging from 10 to 30 feet. As the water table almost everywhere is within 15 feet of the surface, well points

penetrate enough saturated sand of the surficial deposits to yield sufficient water for domestic purposes (5).

Sands of the Peedee formation furnish water to drilled wells in the northwest part of Onslow County. South and east of Richlands little water is pumped from the Peedee because the overlying Tertiary limestone aquifer furnishes adequate water. Except in the northwestern third of the county, salty water probably occurs in the lower part of the Peedee formation, and the entire formation may contain salty water in the vicinity of New River to the south of Jacksonville (5).

The Tertiary limestone unit, represented largely by the Castle Hayne limestone, is the aquifer which drilled wells tap south of US Highway 17. The limestone thins toward the north, but it is an important aquifer as far north as Richlands. The New River is entrenched in the limestone between Richlands and Jacksonville, resulting in a large aggregate discharge of groundwater from the limestone into the river. Some of the discharge is in the from of springs in the vicinity of Catherine Lake (5).

The permeability of the limestone differs greatly from place to place. The majority of the wells in the Holly Ridge are reportedly between 100 to 180 feet deep and draw water from the limestone. The specific capacity of wells range from about 18 to 125 gpm per foot of drawdown (5).

At Camp Lejuene the permeability of limestone is considerably less than at Holly Ridge. Individual gravel-walled wells drawing water from sand and semiconsolidated limestone yield as much as 250 gpm. In most of the wells the specific capacity is 5 to 10 gpm per foot of drawdown (5).

As in adjacent counties, the surficial sand yields water that is soft and is low in dissolved mineral matter. The water generally contains enough dissolved carbon dioxide to render it corrosive. The water in sand of the Peedee is a soft, sodium bicarbonate water that is satisfactory for almost all uses. A hard, calcium bicarbonate water characterizes the Tertiary limestone aquifer. In places the water in the limestone contains objectionable amounts of iron (5).

2.4 Climate and Meteorology (6,7)

Seasonal Temperatures:	°F	January	July
	Mean Max.	>58	86
	Mean Min.	36-40	68-72
	Mean	46-48	>80

Precipitation:	(inches)	
	Mean annual precipitation:	64-72
	Mean annual evaporation:	>42
	Net annual precipitation:	22-30
	Mean annual snowfall:	<2
	One year 24-hr. rainfall:	3.5-4.0
	Mean days/year with thunderstorms:	40-60
	Prevailing winds and wind speeds:	S at 12 MPH

Emissions Inventory Summary for Onslow County (Tons/year) (8)

Type	Area Sources	Point Sources
Particulates	6007	39
Sulfur Dioxide	485	48
Nitrogen Oxides	4326	10
Volatile Organics and Hydrocarbons	7447	--
Carbon Monoxide	35,360	--

2.5 Land Use

The Renroh site is presently a vacant lot surrounded on three sides by residential use. A concrete plant operates across Highway 50 on the west side of the site (1).

2.6 Population Distribution and Water Supply

All of the town of Holly Ridge (population 465; 1980 census) is within one mile of the site (Map 1, Appendix A). The town of Holly Ridge receives water service from Onslow County Water Service which utilizes wells near Richlands approximately 30 miles north of Holly Ridge and a well on NC 210 about 8 miles northeast of Holly Ridge. All areas within the town limits of Holly Ridge are served by this water system. In addition water lines run about 1/2 mile down Highway 17 toward Wilmington and about one 1 mile on Highway 50 east toward the beach. A house count on USGS Topographic Map of the area not served by the town of Holly Ridge indicates 13, 52, 173, and 291 houses within 1, 2, 3, and 4 miles respectively of the Renroh site utilize private wells. Applying a factor of 3.8 residents per house this yields 49, 198, 657, and 1106 residents within 1, 2, 3, and 4 miles of the site, that rely on groundwater (9,10). Mr. Les Haste, Onslow County Health Department reported during the Site Investigation visit that the nearest wells to the site were probably at the Carolina Meat Processors facility approximately 1300 feet

southwest of the site. Mr. Haste reported that Carolina Meat Processors had three wells which are used to obtain water to clean equipment.

2.7 Critical Environments

The closest critical habitat is Lake Waccamaw approximately 60 miles southwest of Holly Ridge. Lake Waccamaw is the home of the Waccamaw Silverside (Menidia extensa), a threatened species (11). There are also several wetland areas within about one mile of the Renroh site. The Holly Shelter State Wildlife Management Area, which consists primarily of wetlands, is about 2.5 miles southwest of the site (Map 1, Appendix A).

3.0 WASTE TYPES AND QUANITITIES

No hazardous wastes or substances were identified remaining on the site at the time of the Site Investigation visit. During the court ordered removal in 1980, approximately 2,000 drums of 2,4-dinitrophenol were removed (1,2,3,9).

4.0 LABORATORY DATA

The laboratory data is presented in Appendix B of this report. No hazardous wastes or substances were identified in surface soil collected from around the foundation of the former warehouse at the site that were significantly above background. No groundwater samples were collected as there are no monitoring wells on the site and no drinking water wells in the immediate vicinity of the site.

5.0 TOXICOLOGICAL CHEMICAL CHARACTERISTICS

The toxicological and chemical characteristics of 2,4-dinitrophenol are presented on the following page (12.)

2,4-DINITROPHENOL

CAS RN: 51285 NIOSH #: SL 2800000
mf: $C_6H_4N_2O_5$; mw: 184.12

Yellow crystals. mp: 112°, d: 1.683 @ 24°, vap. d: 6.35.

SYNS:

2,4-DINITROFENOL (DUTCH)	1-HYDROXY-2,4-DINITROBENZENE
DINITROFENOLO (ITALIAN)	NSC 1532
ALPHA-DINITROPHENOL	

TOXICITY DATA: 3	CODEN:
cyt-mus-ipr 10 gm/kg	IJMRAQ 59,1442,71
orl-rat TDLo:2040 mg/kg (8D pre-21D post)	PSEBAA 32,678,35
ipr-mus TDLo:40800 ug/kg (10-12D preg)	FCTXAV 11,31,73
skn-rbt 300 mg/4W-I MLD	JIHTAB 30,10,48
mmo-esc 200 ppm/3H	AMNTA4 85,119,51
orl-hmn LDLo:4300 ug/kg	JAMAAP 101,1333,33
orl-rat LD50:30 mg/kg	TXAPA9 21,315,72
ipr-rat LD50:20 mg/kg	JPPMAB 17,814,65
scu-rat LD50:25 mg/kg	JPETAB 49,187,33
unk-rat LD50:27 ug/kg	FMCHA2 -,D107,80
orl-mus LD50:45 mg/kg	FATOAO 28,493,65
ipr-mus LD50:26 mg/kg	BCPCA6 18,1389,69
orl-dog LDLo:30 mg/kg	JPETAB 49,187,33
scu-dog LDLo:20 mg/kg	JPETAB 49,187,33
ivn-dog LDLo:15 mg/kg	JPETAB 49,187,33
orl-rbt LD50:30 mg/kg	FATOAO 28,493,65
scu-rbt LDLo:20 mg/kg	JPETAB 49,187,33
orl-gpg LD50:81 mg/kg	FATOAO 28,493,65
skn-gpg LDLo:700 mg/kg	JIHTAB 30,10,48
scu-gpg LDLo:25 mg/kg	AEPPAE 192,331,39
ims-pgn LDLo:7500 ug/kg	JPETAB 49,187,33
unk-mam LD50:40 gm/kg	30ZDA9 -,97,71
orl-bwd LD50:13 mg/kg	TXAPA9 21,315,72

Aquatic Toxicity Rating: TLm96:10-1 ppm WQCHM* 4,-,74. *Toxicology Review:* 31ZNAA 1(1),93,71. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.

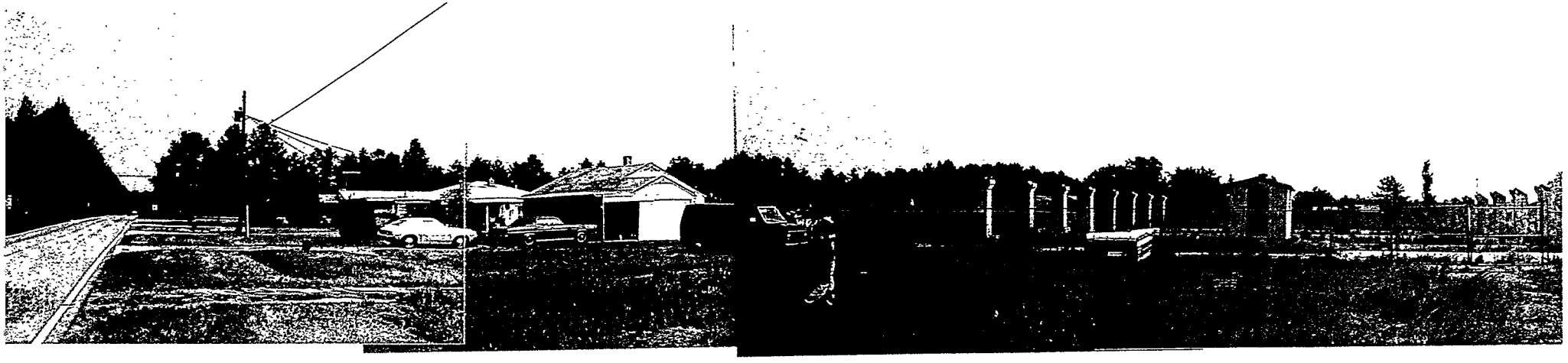
THR: MUT data. A skn irr. HIGH orl, ipr, scu, unk, ims. Phytotoxic. See also nitrates.

Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

For further information see Vol. 2, No. 2 of *DPIM Report.*

Appendix A

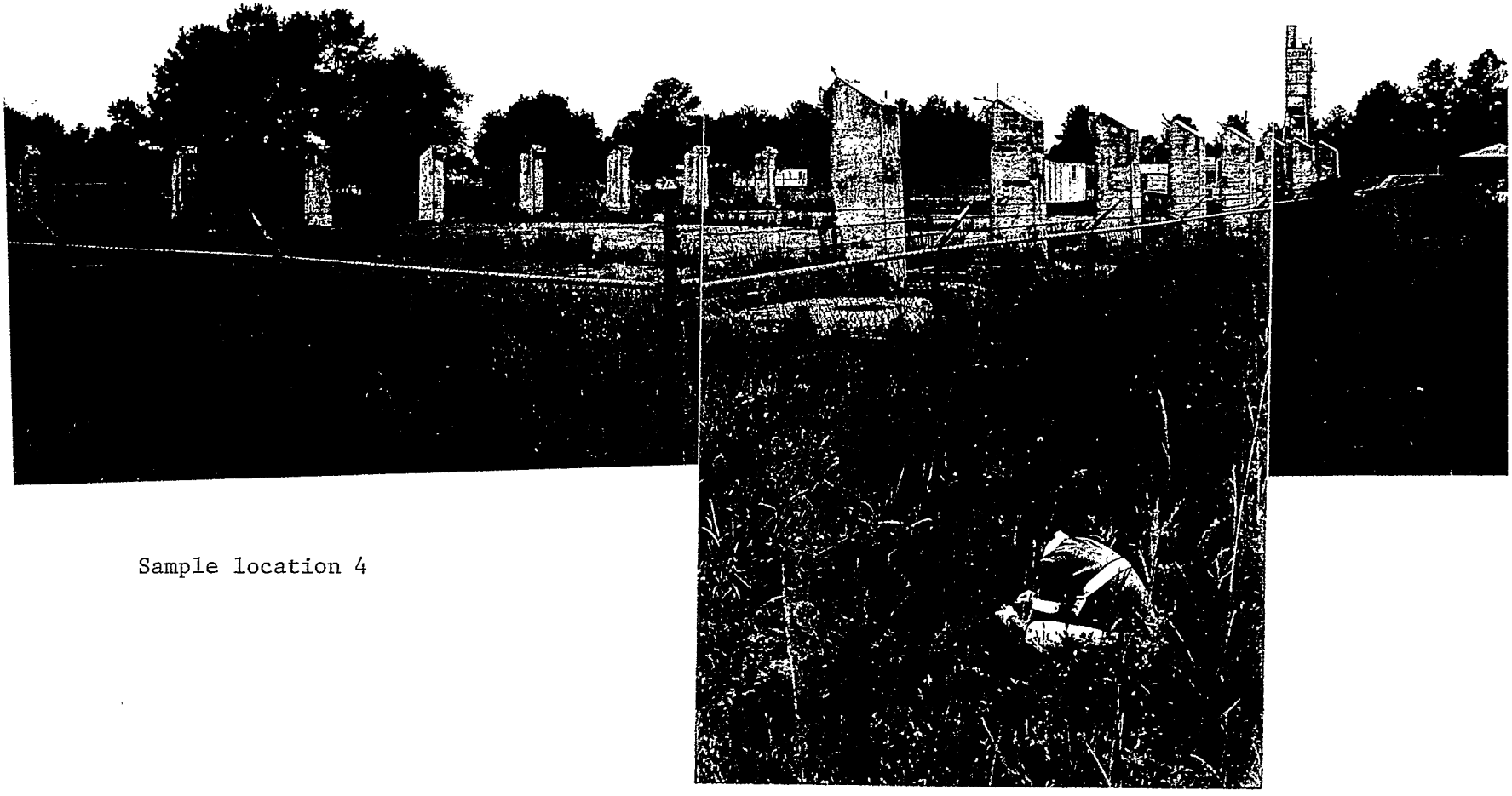
Maps and Photographs



Renroh Site

Sample location 1

Sample location 2



Sample location 4

Appendix B

Laboratory Data

DIVISION OF WASTE SERVICES
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH

Chain of Custody Record

Hazardous Waste Materials

RECEIVED
OCT 11 1989
SUPERFUND SECTION

Location of Sampling: ___ Generator ___ Transporter ___ Treatment Facility
___ Storage Facility ___ Disposal Facility ___ Landfill
✓ Other: Superfund

Company's Name Ranbaxy Telephone( ) None

Address Holly Ridge, N.C.

Collector's Name Jack Butler Telephone(919) 733-2801
signature

Date Sampled Aug. 8, 1989 Time Sampled 11:30 - 12:00

Type of Process Generating Waste Warehouse - 2,4-dinitrophenol

Field Information

Field Sample No. 15566 15567 15568 15569 ___ ___ ___

___ ___ ___ ___ ___ ___ ___

Chain of Possession:

	signature	title	inclusive dates
1.	Jack Butler	Env. Eng.	Aug. 8&9, 1989
2.	Joyce Dorin	Chem Analyst I	7 Aug 89
3.			

Results reported

	signature	title	date
	Joyce Dorin	Chem Analyst I	9 Oct 89

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

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 6T098072868 7 Field Sample Number 15566

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:35

Type of Sample:

Environmental
- ___ Groundwater (1)
- ___ Surface Water (2)
- ✓ Soil (3)
- ___ Other (4)

Concentrate
- ___ Solid (5)
- ___ Liquid (6)
- ___ Sludge (7)
- ___ Other (8)

Comments: 1-Bkgr. soil

RECEIVED
OCT 11 1989
SUPERFUND SECTION

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
✓ Arsenic	<0.01	✓ Arsenic	<19	✓ Silver	<38
✓ Barium	<0.04	✓ Barium	8	___ Sulfates	
✓ Cadmium	<0.08	✓ Cadmium	<15	___ Zinc	
✓ Chromium	<0.20	___ Chloride		___ Ph	
✓ Lead	<1.00	✓ Chromium	<38	___ Conductivity	
✓ Mercury	<0.02	___ Copper		___ TDS	
✓ Selenium	<0.005	___ Fluoride		___ TOC	
✓ Silver	<0.20	___ Iron			
		✓ Lead	3.3		
		___ Manganese			
		✓ Mercury	<0.10		
		___ Nitrate			
		✓ Selenium	<4		

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 ___

Date Extracted ___ Date Analyzed ___

Reported By ___ Lab Number 15806 AUG 989

DHS 3191 (Revised 7/85)

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

SAMPLE ANALYSES REQUEST

State Laboratory of Public Healt
P. O. Box 2804
306 N. Wilmington Stre
Raleigh, 2761

Site Number 670980728687 Field Sample Number 15567

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:45

Type of Sample:

Environmental	Concentrate
___ Groundwater (1)	___ Solid (5)
___ Surface Water (2)	___ Liquid (6)
✓ Soil (3)	___ Sludge (7)
___ Other (4)	___ Other (8)

Comments: 2-South corner soil

RECEIVED
OCT 11 1989
SUPERFUND SECTION

INORGANIC CHEMISTRY

Extractables

Parameter	Results mg/1
✓ Arsenic	<0.01
✓ Barium	<0.04
✓ Cadmium	<0.08
✓ Chromium	<0.20
✓ Lead	<1.00
✓ Mercury	<0.02
✓ Selenium	<0.005
✓ Silver	<0.20

Total

Parameter	Results mg/1
✓ Arsenic	<10
✓ Barium	12
✓ Cadmium	<16
___ Chloride	
✓ Chromium	<39
___ Copper	
___ Fluoride	
___ Iron	
✓ Lead	70
___ Manganese	
✓ Mercury	<0.10
___ Nitrate	
✓ Selenium	<4

Parameter	Results mg/1
✓ Silver	<39
___ Sulfates	
___ Zinc	
___ Ph	
___ Conductivity	
___ TDS	
___ TOC	

ORGANIC CHEMISTRY

Parameter	Results mg/1
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ TOX	

Parameter	Results mg/1
___ EDB	
___ PCB's	
___ Petroleum	
___ Endrin	
___ Lindane	

Parameter	Results mg/1
___ Methoxychlor	
___ Toxaphene	
___ 2,4-D	
___ 2,4,5-TP (silvex)	

MICROBIOLOGY

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

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received ___ Date Reported ___

Date Extracted ___ Date Analyzed ___

Reported By ___ Lab Number 15807 AUG 89

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

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 67D980728687 Field Sample Number 15568

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:50

Type of Sample:

Environmental
- ____ Groundwater (1)
- ____ Surface Water (2)
- ✓ Soil (3)
- ____ Other (4)

Concentrate
- ____ Solid (5)
- ____ Liquid (6)
- ____ Sludge (7)
- ____ Other (8)

Comments: 3 - East Corner Soil

RECEIVED
OCT 11 1989
SUPERFUND SECTION

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/l	Parameter	Results mg/l	Parameter	Results mg/l
✓ Arsenic	<0.01	✓ Arsenic	<9	✓ Silver	<36
✓ Barium	<0.04	✓ Barium	16	____ Sulfates	
✓ Cadmium	<0.08	✓ Cadmium	<14	____ Zinc	
✓ Chromium	<0.20	____ Chloride		____ Ph	
✓ Lead	<1.00	✓ Chromium	<36	____ Conductivity	
✓ Mercury	<0.02	____ Copper		____ TDS	
✓ Selenium	<0.005	____ Fluoride		____ TOC	
✓ Silver	<0.20	____ Iron			
		✓ Lead	89		
		____ Manganese			
		✓ Mercury	<0.10		
		____ Nitrate			
		✓ Selenium	<3		

ORGANIC CHEMISTRY

Parameter	Results mg/l	Parameter	Results mg/l	Parameter	Results mg/l
____ 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/l
____ Gross Alpha	
____ Gross Beta	

Date Received ____ Date Reported ____

Date Extracted ____ Date Analyzed ____

Reported By ____ Lab Number 15608 AUG 89

DHS 3191 (Revised 7/85)

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 6T098072868 7 Field Sample Number 15569

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:55

Type of Sample:

Environmental
- ____ Groundwater (1)
- ____ Surface Water (2)
- ✓ Soil (3)
- ____ Other (4)

Concentrate
- ____ Solid (5)
- ____ Liquid (6)
- ____ Sludge (7)
- ____ Other (8)

Comments: 4-North Corner Soil

RECEIVED
OCT 11 1989
SUPERFUND SECTION

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
✓ Arsenic	<0.01	✓ Arsenic	<10	✓ Silver	<39
✓ Barium	<0.04	✓ Barium	16	____ Sulfates	
✓ Cadmium	<0.08	✓ Cadmium	<16	____ Zinc	
✓ Chromium	<0.20	____ Chloride		____ Ph	
✓ Lead	<1.00	✓ Chromium	39	____ Conductivity	
✓ Mercury	<0.02	____ Copper		____ TDS	
✓ Selenium	<0.005	____ Fluoride		____ TOC	
✓ Silver	<0.20	____ Iron			
		✓ Lead	210		
		____ Manganese			
		✓ Mercury	<0.10		
		____ Nitrate			
		✓ Selenium	<4		

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 ____

Date Extracted ____ Date Analyzed 15609 AUG 989

Reported By ____ Lab Number ____

DHS 3191 (Revised 7/85)

DIVISION OF WASTE SERVICES
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH

Chain of Custody Record

Hazardous Waste Materials

RECEIVED
SUPERFUND BRANCH

Location of Sampling: ___Generator ___Transporter ___Treatment Facilit
___Storage Facility ___Disposal Facility ___Landfill
✓ Other: Superfund

Company's Name Rennoh Telephone( ) None

Address Holly Ridge, N.C.

Collector's Name Jack Butler Telephone(919) 733-2801
signature

Date Sampled Aug. 8, 1989 Time Sampled 11:30 - 12:00

Type of Process Generating Waste Warehouse - 2,4-dinitrophenol

Field Information

Field Sample No. 11720 11721 11722 11723

Chain of Possession:

1. Jack Butler (signature) Env. Eng. (title) Aug. 8&9, 1989 (inclusive dates)
2. Nancy Ward (signature) Chemist (title) 8-9-89 (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.

SUPERFUND BRANCH
401 OBERLIN ROAD

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 6709807286 87 Field Sample Number 11720

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:35

Type of Sample:

Environmental	Concentrate
____ Groundwater (1)	____ Solid (5)
____ Surface Water (2)	____ Liquid (6)
✓ Soil (3)	____ Sludge (7)
____ Other (4)	____ Other (8)

Comments: 1-Bkgr. Soil

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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 8-9-89 mw Date Reported 9-1-89

Date Extracted 8-15-89 AA Date Analyzed BNA 8-17-89 BD PT 9-7-89 mw

Reported By John L. Neal Lab Number 902230

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

#902230-902233

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 67D980728687 Field Sample Number 11721

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:45

Type of Sample:

Environmental
- ____ Groundwater (1)
- ____ Surface Water (2)
- ✓ Soil (3)
- ____ Other (4)

Concentrate
- ____ Solid (5)
- ____ Liquid (6)
- ____ Sludge (7)
- ____ Other (8)

Comments: 2-South Corner Soil

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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 8-9-89 nw Date Reported

Date Extracted 8-15-89 AA Date Analyzed BNA 8-17-89 BD PT 9-7-89 nw

Reported By Lab Number 902231

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

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 67D980728687 Field Sample Number 11722

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:50

Type of Sample:

Environmental
- ____ Groundwater (1)
- ____ Surface Water (2)
- ✓ Soil (3)
- ____ Other (4)

Concentrate
- ____ Solid (5)
- ____ Liquid (6)
- ____ Sludge (7)
- ____ Other (8)

Comments: 3-East Corner Soil

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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 8-9-89 MW Date Reported

Date Extracted 8-15-89 AA Date Analyzed BNA 8-17-89 BA PT 9-7-89 MW

Reported By Lab Number 902232

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

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 67D980728687 Field Sample Number 11723

Name of Site Renroh Site Location Holy Ridge

Collected By Jack Butler ID# 44 Date Collected 8-8-89 Time 11:55

Type of Sample:

Environmental
- ____ Groundwater (1)
- ____ Surface Water (2)
- ✓ Soil (3)
- ____ Other (4)

Concentrate
- ____ Solid (5)
- ____ Liquid (6)
- ____ Sludge (7)
- ____ Other (8)

Comments: 4-North Corner Soil

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SUPERFUND BRANCH

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 8-9-89 mw Date Reported

Date Extracted 8-15-89 AA Date Analyzed BNA 8-17-89 BQ PT 9-8-89 mw

Reported By Lab Number 902233

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

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	902230	902231	902232	902233		
	FIELD #	11720	11721	11722	11723		
COMPOUND	TYPE	(3)	(3)	(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	10/330	U	U	U	U		
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	50/1650						
2,4-dinitrotoluene	10/330						
4-nitrophenol	50/1650						
fluorene	10/330						
4-chlorophenylphenylether	↓						
diethyl phthalate	↓						
4,6-dinitro-o-cresol	50/1650						
diphenylamine	↓						
azobenzene	↓						
4-bromophenylphenylether	10/330						
hexachlorobenzene	10/330						
pentachlorophenol	50/1650						
phenanthrene	10/330						
anthracene							
dibutyl phthalate							
fluoranthene	↓	↓	↓	↓	↓		

MDL
H_2O/501L

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. MDL
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

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	902230	902231	902232	902233		
	FIELD #	11720	11721	11722	11723		
COMPOUND	TYPE	(3)	(3)	(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	10/330	U	U	U	U		
benzidine	50/1650						
butyl benzyl phthalate	10/330						
benz(a)anthracene	↓						
chrysene	↓						
3,3-dichlorobenzidine	50/1650						
bis(2-ethylhexyl)phthalate	10/330						
di-n-octyl phthalate	10/330						
benzo(b)fluoranthene	50/1650						
benzo(k)fluoranthene	↓						
benzo(a)pyrene	↓						
indeno(1,2,3-cd)pyrene	↓						
dibenzo(a,h)anthracene	↓						
benzo(g,h,i)perylene	↓	↓	↓	↓	↓		
aniline	50/1650	U	U	U	U		
benzoic acid	↓						
benzyl alcohol	↓						
4-chloroaniline	↓						
dibenzofuran	10/330						
2-methylnaphthalene	↓						
2-methylphenol	↓						
4-methylphenol	↓						
2-nitroaniline	50/1650						
3-nitroaniline	↓						
4-nitroaniline	↓						
2,4,5-trichlorophenol	↓	↓	↓	↓	↓		

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MDL
H2O/50IL

E - 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. MDL
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)

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

PURGEABLE COMPOUNDS	LAB NO	902230	902231	902232	902233		
	FIELD #	11720	11721	11722	11723		
COMPOUND	TYPE	(3)	(3)	(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
chloromethane	10	U	U	U	U		
bromomethane	10						
dichlorodifluoromethane	5						
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	10						
propane, 1,2-dichloro-	5						
1,3-trans-dichloropropene							
trichloroethylene	↓						
chlorodibromomethane	10						
benzene	5						
ethane, 1,1,2-trichloro-							
1,3-cis-dichloropropene	↓						
2-chloroethyl vinyl ether	10						
bromoform	10						
ethane, 1,1,2,2-tetrachloro-	5						
ethene, tetrachloro-							
toluene							
chlorobenzene							
ethylbenzene	↓	↓	↓	↓	↓		
acetone	10	U	U	U	U		
2-butanone	10						
carbondisulfide	5						
2-hexanone	10						
4-methyl-2-pentanone	10						
styrene	5						
vinyl acetate	10						
xylenes (total)	5	↓	↓	↓	↓		
	↑MDL↑						

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J - Estimated value.
< - Actual value is known to be less than value given.
> - 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-O (4/86 Laboratory)

Appendix C

References

REFERENCES

1. Site Visit Report from Jack Butler, NC Superfund Section to Robert Morris, US EPA Region IV, 9 August 1989.

2. Memo from Dan Oakley, NC Department of Justice, to Chuck Wakild and O.W. Strickland, NC DHR/DHS, 25 January 1980.

3. Letter from Daniel C. Oakley, Assistant Attorney General, to Henry L. Stevens, III, District Judge, 15 February 1980.

4. Classifications and Water Quality Standards Assigned to the Cape Fear River Basin. Department of Natural and Economic Resources, Division of Environmental Management, Raleigh, NC, 15 NCAC2B.0311, 1989.

5. Harry E. LeGrand. Geology and Ground-Water Resources of Wilmington-New Bern Area. North Carolina Department of Water Resources Division of Ground-Water, Ground-Water Bulletin No. 1, 1960.

6. Clay, J.W., D.M. Orr, Jr. and A.W. Stuart. North Carolina Atlas: Portrait of A Changing Southern State. University of NC Press, Chapel Hill, 1975.

7. Uncontrolled Hazardous Waste Site Ranking System; A User's Manual. National Oil and Hazardous Substances Contingency Plan, Appendix A (40 CFR 300), or (47 FR 31219), 16 July 1982.

8. North Carolina State Governmental Statistical Abstract. Fifth Edition, North Carolina State Data Center, Research and Planning Service, Office of State Data Center, Research and Planning Services, Office of State Budget and Management.

9. Preliminary Assessment Update from Jack Butler, NC Superfund Section, to Susan Deihl, US EPA Region IV, 25 April 1988.

10. Memo from Jack Butler, NC Department of Human Resources/Division of Health Services, to file, Water Service within 3 miles of Renroh, NCD980728687, 22 April 1988.

11. Memo and attachments from Pat DeRosa, NC Superfund Branch, to Superfund Branch Staff, 18 May 1989.

12. Sax, N.I. Dangerous Properties of Industrial Materials, 6th edition, Van Nostrand Reinhold Co., New York, 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
David T. Flaherty, Secretary

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

9 August 1989

Mr. Robert Morris
EPA NC CERCLA Project Officer
EPA Region IV Waste Division
345 Courtland Street, NE
Atlanta, GA 30365

Dear Mr. Morris:

RE: Site Visit Report
Renroh, NCD980728687
Highway 50 and Lloyd Street
Holly Ridge, Onslow County, NC 28445

The Renroh site is located at the corner of Hwy. 50 and Lloyd Street in Holly Ridge, NC. This is in Onslow County. The county code is 67 and this is in the third Congressional District.

In 1977 approximately 2,000 drums of 2,4-dinitrophenol were discovered in a dilapidated US Army gym in Holly Ridge, NC. This building was originally built in the early 1940's as part of Camp David. At the time of the discovery the building was owned by Doug Horner, Renroh, and was being used as a warehouse.

When discovered, the roof of the building had caved in and a number of the drums had broken open. In 1980 the drums were removed under a court order. Most of the drums were moved to Lackey Inds. Whse. (NCD080891039) in Whiteville, NC. Several hundred were reportedly sent to Renroh warehouse in New Bern, and American Cyanamide in Damascus, Virginia, and approximately 100 drums were sold to Mr. Marlow Bostic (Bostic Drum Site, NCD982119554), and some were reportedly shipped to an unknown company in Taiwan.

After the drums were removed from the Renroh site, the property was owned for approximately one year by the City of Holly Ridge who sold it to Allen Hobbs in 1982. The dilapidated building has been removed and the site is presently a vacant lot. The concrete slab floor and fence that was erected around the building after the drum removal remain on the site.

On August 8, 1989, Jack Butler and Ed Wallingford, NC Superfund Section performed a site investigation visit to the subject site. Mr. Les Haste and Mr. Sam Frazelle, Onslow County Health Department were also present during a portion of this visit. Surface soil samples were collected on the site. Laboratory results are pending. No residential wells were observed in the immediate vicinity of the site.

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

Sincerely,

Jack Butler

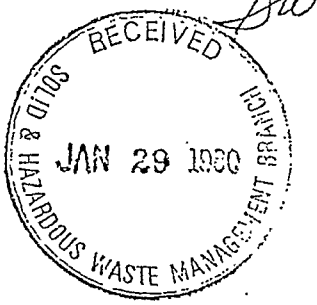
Jack Butler, Environmental Engineer
Superfund Section
Solid Waste Management Division

JB/ds/7

Onslow

Ref. 2

COPY



State of North Carolina
Department of Justice
RALEIGH

25 January 1980

MEMO TO: Chuck Wakild, W. O. Strickland

FROM: Dan Oakley

RE: State v. Renroh, Inc. & Onslow County

A hearing on a motion for civil contempt against the defendants was conducted by Judge Stevens in Jacksonville on January 23, 1980. An order will shortly be signed by the Judge setting an average removal rate, for the barrels of "2-4 Dinitrophenol", of 200 per week over any 4 week period, beginning January 28, 1980 and extending until all barrels are removed. There are approximately 1400-1800 barrels remaining. The Judge also is requiring the defendants to locate a back-up storage facility in the event the present disposition alternative (a Whiteville warehouse) becomes unavailable. He specifically requested the State to provide whatever assistance it could in securing a suitable storage site within or without Holly Ridge. Dave Hershman of this office will be making such an effort, but we would appreciate your assistance (Division of Environmental Management, Division of Health Services) since you have regional offices in the area. What we are primarily interested in is a listing of possible warehouse facilities which could store barrels for a short period of time.

Please let me know as soon as possible if you have any comments or suggestions.

/dw

Onslow

Ref. 3

RUFUS L. EDMISTEN
ATTORNEY GENERAL

State of North Carolina
Department of Justice
P. O. Box 629
RALEIGH
27602

15 February 1980

Honorable Henry L. Stevens, III
P. O. Box 26
Kenansville, North Carolina 28249

RE: Town of Holly Ridge v. Horner, et al, 78CVS 715
State v. Renroh, Inc., et al, 78CVS1263
(Onslow County)

Dear Judge Stevens:

In our hearing concerning this matter on January 23, 1980, you requested the State to assist in the location of a back-up facility for storage of the Dinitrophenol, in the event the current Whiteville warehouse becomes unavailable. Mr. Dave Hershman of this office has spoken with Ms. Lavinia Thaxton of the Port City Bonded Warehouse in Charleston, South Carolina (803/747-4838), which received two shipments of the material in November, 1979. Ms. Thaxton indicated that space at the facility was limited at this time, but they would be interested in discussing storage when the exact number of drums is known.

The State suggests that, if the Whiteville facility becomes unavailable, Mr. Horner or Continental Trading Company contact the Port City Bonded Warehouse regarding storage.

I trust this information will be helpful to the defendants. Please advise if you feel the State should do anything else. Thank you for your assistance.

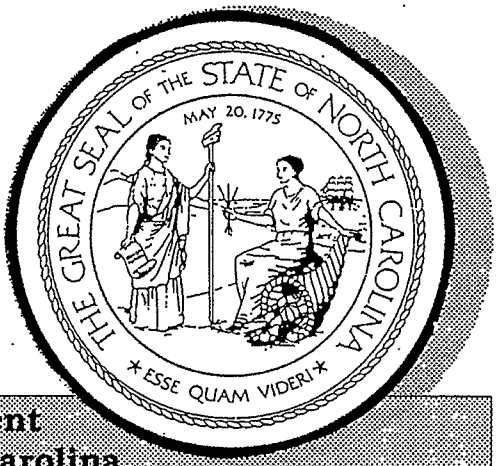
Sincerely,

RUFUS L. EDMISTEN
Attorney General
Dan C. Oakley
Daniel C. Oakley
Assistant Attorney General

DCO/dw
cc: Frank Erwin
Laurence Stith
John D. Warlick
C. E. Hancock
Dr. Fred Liu

STATE OF NORTH CAROLINA
DEPARTMENT OF
NATURAL RESOURCES AND
COMMUNITY DEVELOPMENT

Classifications and Water Quality Standards Assigned to The Waters of The Cape Fear River Basin



Division of Environmental Management
Raleigh, North Carolina

Reprint from North Carolina Administrative Code: 15 NCAC 2B .0311
Current through: June 30, 1989

SECTION .0300 - ASSIGNMENT OF STREAM CLASSIFICATIONS

.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 which are on file in the Office of the Attorney General of North Carolina. 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 WS-I, WS-II, WS-III, B, C, SA, SB, and SC in the column headed "class." A brief explanation of the "best usage" for which the waters in each class must be protected is given as follows:

Fresh Waters

Class WS-I:	waters protected as water supplies which are in natural and uninhabited or predominantly undeveloped (not urbanized) watersheds; no point source discharges are permitted and local land management programs to control nonpoint source pollution are required; suitable for all Class C uses;
Class WS-II:	waters protected as water supplies which are in low to moderately developed (urbanized) watersheds; discharges are restricted to primarily domestic wastewaters or industrial non-process waters specifically approved by the commission; local land management programs to control nonpoint source pollution are required; suitable for all Class C uses;
Class WS-III:	water supply segment with no categorical restrictions on watershed development or discharges; suitable for all Class C uses;
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.

Supplemental Classifications

Trout Waters:	Suitable for natural trout propagation and maintenance of stocked trout;
Swamp Waters:	Waters which have low velocities and other natural characteristics which are different from adjacent streams;
NSW:	Nutrient sensitive waters which require limitations on nutrient inputs;
ORW:	outstanding resource waters which are unique and special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses.

(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) 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 number in the schedule is to provide an adequate cross reference between the classification schedules and an alphabetic list of streams.

(f) 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.

(g) 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

(h) Places where the schedules may be inspected:

Division of State Library
Archives -- State Library Building
109 E. Jones Street
Raleigh, North Carolina.

(i) Unnamed Streams.
(1) Any stream which is not named in the schedule of stream classifications carries the same classification as that assigned to the stream segment to which it is tributary except:
(A) unnamed streams specifically described in the schedule of classifications; or
(B) unnamed freshwaters tributary to tidal saltwaters will be classified "C"; or
(C) after November 1, 1986, any newly created areas of tidal saltwater which are connected to Class SA waters by approved dredging projects will be classified "SC" unless case-by-case reclassification proceedings are conducted.
(2) The following river basins have different policies for unnamed streams entering other states or for specific areas of the basin:
Hiwassee River Basin (Rule .0302)
Little Tennessee River Basin and Savannah River Drainage Area (Rule .0303)
French Broad River Basin (Rule .0304)
Watauga River Basin (Rule .0305)
Broad River Basin (Rule .0306)
New River Basin (Rule .0307)
Catawba River Basin (Rule .0308)
Yadkin-Pee Dee River Basin (Rule .0309)
Lumber River Basin (Rule .0310)
Roanoke River Basin (Rule .0313)
Tar-Pamlico River Basin (Rule .0316)
Pasquotank River Basin (Rule .0317)

History Note: Statutory Authority G.S. 143-214.1; 143-215.1; 143-215.3(a)(1);
Eff. February 1, 1976;
Amended Eff. November 1, 1986; February 1, 1986; January 1, 1985;
September 9, 1979.

.0311 CAPE FEAR RIVER BASIN

(a) Places where the schedules may be inspected:

(1) Clerk of Court:
Alamance County
Bladen County
Brunswick County
Caswell County
Chatham County
Columbus County
Cumberland County
Duplin County
Durham County
Forsyth County
Guilford County
Harnett County
Hoke County
Lee County
Montgomery County
Moore County
New Hanover County
Onslow County
Orange County
Pender County
Randolph County
Rockingham County
Sampson County
Wake County
Wayne County

(2) North Carolina Department of Natural Resources and Community Development:

(A) Winston-Salem Regional Office
8003 Silas Creek Parkway Extension
Winston-Salem, North Carolina

(B) Fayetteville Regional Office
Wachovia Building
Suite 714
Fayetteville, North Carolina

(C) Raleigh Regional Office
3800 Barrett Drive
Raleigh, North Carolina

(D) Washington Regional Office
1502 North Market Street
Washington, North Carolina

(E) Wilmington Regional Office
7225 Wrightsville Avenue
Wilmington, North Carolina

.0311 CAPE FEAR RIVER BASIN

Name of Stream	Description	Class	Classification Date	Classification Index No.
	of Snows Cut exclusive of restricted areas listed below			
Turkey Creek	From soruce to Intracoastal Waterway	SA	8/9/81	18-87-1
Everett Bay	Entire Bay excluding that portion in King Creek Restricted Area	SA	8/9/81	18-87-2
Stump Sound	Entire Sound excluding that portion in King Creek Restricted Area	SA	8/9/81	18-87-3
King Creek Restricted Area (Spicer Bay)	Inside a line beginning at a point on the mainland and running due south 100 yards to reflector buoy #43 in the Intracoastal Waterway, thence along the south side of the Intracoastal Waterway Channel 1,200 yards to flashing light channel marker #39, thence due north 200 yards to a point on the mainland, then along the shore line to the point of beginning to include all of King Creek	SC Sw	4/1/59	18-87-4
Hardison Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-5
Batts Mill Creek (Barlow Creek)	From source to Intracoastal Waterway	SA	8/9/81	18-87-6
County Line Branch	From source to Batts Mill Creek	SA	8/9/81	18-87-6-1
Cypress Branch	From source to Batts Mill Creek	SA	8/9/81	18-87-6-2
Old Mill Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-7
Beckys Creek (Bishops Creek)	From source to Intracoastal Waterway	SA	8/9/81	18-87-8
Virginia Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-9
Mullet Run	From source to Virginia Creek	SA	8/9/81	18-87-9-1
Topsail Sound	Entire Sound	SA	8/9/81	18-87-10
Banks Channel	From New Topsail Inlet to Topsail Sound	SA	8/9/81	18-87-10-1
Nixons Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-11
Old Topsail Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-12
Howard Channel	From Old Topsail Inlet to Intracoastal Waterway	SA	8/9/81	18-87-13
Mill Creek (Betts Creek)	From source to Intracoastal Waterway	SA	8/9/81	18-87-14
Long Point Channel	From Old Topsail Inlet to Intracoastal Waterway	SA	8/9/81	18-87-15
Green Channel	From Rich Inlet to Intracoastal Waterway	SA	8/9/81	18-87-16
Cedar Snag Creek	From Green Channel to Intracoastal Waterway	SA	8/9/81	18-87-17
Butler Creek	From Nixon Channel to Intracoastal Waterway	SA	8/9/81	18-87-18
Futch Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-19
Nixon Channel	From Rich Inlet to Intracoastal Waterway	SA	8/9/81	18-87-20
Middle Sound	Entire Sound excluding that portion in Wrightsville Restricted Area	SA	8/9/81	18-87-21
Pages Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-22
Howe Creek	From source to Intracoastal Waterway	SA	8/9/81	18-87-23
Wrightsville Recreational Area	In any waters within a line beginning at a point on the mainland along the	SB #	10-1-87	18-87-24

Ref. 5

NORTH CAROLINA
DEPARTMENT OF WATER RESOURCES

HARRY E. BROWN, *Director*

DIVISION OF GROUND WATER
HARRY M. PEEK, *Chief*

GROUND-WATER BULLETIN NUMBER 1

GEOLOGY AND GROUND-WATER RESOURCES OF WILMINGTON-NEW BERN AREA

By

HARRY E. LeGRAND
Geologist, United States Geological Survey

PREPARED IN COOPERATION WITH THE GEOLOGICAL SURVEY
UNITED STATES DEPARTMENT OF THE INTERIOR
1960

Onslow County

Geology

The oldest formation penetrated by a water well in Onslow County is the Peedee. It is not known to crop out but lies within 30 feet of the surface in some valleys northwest of Richlands. Coastward the Peedee is more deeply buried, lying under a wedge of Castle Hayne limestone that thickens toward the coast. The Castle Hayne is exposed at many places along New River between Richlands and Jacksonville. Southwest Creek and White Oak River are other streams whose channels lie in the limestone in the northern part of the county. The Yorktown formation overlies the Castle Hayne, but it has been eroded away in parts of the county north of Jacksonville. Along the coast the Yorktown reaches a thickness of about 60 feet but inland it is thinner. The Yorktown is exposed in several ravines near Silverdale (Brown, P. M., personal communication) and occurs within 60 feet of the surface in several wells at Camp Lejeune. A thin layer of sand and clay—chiefly sand—of Pleistocene age conceals the older formations in the interstream areas.

Ground Water

Three main aquifers furnish water to wells in Onslow County. These are the surficial sands, the sands of the Peedee, and the Tertiary limestone unit.

The surficial sand covers the entire county to a depth generally ranging from 10 to 30 feet. As the water table almost everywhere is within 15 feet of the surface, well points penetrate enough saturated sand of the surficial deposits to yield sufficient water for domestic purposes.

Sands of the Peedee formation furnish water to drilled wells in the northwest part of Onslow County. The ability of the sands of the Peedee to yield water is shown by a city well 535 feet deep at Richlands, which yields 500 gpm at a drawdown of about 80 feet. Except for 30 feet of sand and clay at the surface, the well tapped only the Peedee formation. The water-bearing unit consists of sand, interbedded with clay and indurated calcareous beds. South and east of Richlands little water is pumped from the Peedee because the overlying Tertiary limestone aquifer furnishes adequate water. Except in the northwestern third of the county, salty water probably occurs in the lower part of the Peedee formation, and the entire formation may contain salty water in the vicinity of New River to the south of Jacksonville.

The Tertiary limestone unit, represented largely by the Castle Hayne limestone, is the aquifer which drilled wells tap south of U. S. Highway 17. The limestone thins toward the north, but it is an important aquifer as far north as Richlands. The New River is entrenched in the limestone between Richlands and Jacksonville, resulting in a large aggregate discharge of ground water from the limestone into the river. Some of the discharge is in the form of springs in the vicinity of Catherine Lake. One spring, 1½ miles south of Catherine Lake is reported to have flowed 1,500 gallons a minute (Pratt, 1908, p. 92). The limestone unit varies considerably in composition and degree of consolidation from place to place. Almost everywhere one or more indurated beds occur, and open-end wells can be used. At Camp Lejeune, however, consolidated beds are not prominent, and gravel-wall wells are used.

The permeability of the limestone differs greatly from place to place. The wells at Camp Davis (Holly Ridge) are between 100 and 180 feet deep and draw water from the limestone. The specific capacity of wells ranged from about 18 to 125 gpm per foot of drawdown. One well yielded 250 gpm at a drawdown of only 4 feet, whereas one of the poorer wells yielded 200 gpm at a drawdown of 11 feet.

At Camp Lejeune the permeability of the limestone is considerably less than at Holly Ridge. Individual gravel-walled wells drawing water from sand and semiconsolidated limestone yield as much as 250 gpm. In most of the wells the specific capacity is 5 to 10 gpm per foot of drawdown. In order to guard against salt-water encroachment the wells are pumped so that the pumping level does not get below about 20 feet below sea level.

As in adjacent counties, the surficial sand yields water that is soft and is low in dissolved mineral matter. The water generally contains enough dissolved carbon dioxide to render it corrosive. The water in sand of the Peedee is a soft, sodium bicarbonate water that is satisfactory for almost all uses. A hard, calcium bicarbonate water characterizes the Tertiary limestone aquifer. In places the water in the limestone contains objectionable amounts of iron.

The most serious problem concerning the quality of water in Onslow County is the possibility of salt-water encroachment. Figure 8 shows the approximate depth to water containing as much as 250 ppm of chloride. This map indicates that care must be taken to keep pumping levels relatively shallow in the general area surrounding Jacksonville and Camp Lejeune. There is no evidence that salt-water encroachment has occurred, and there is no cause for

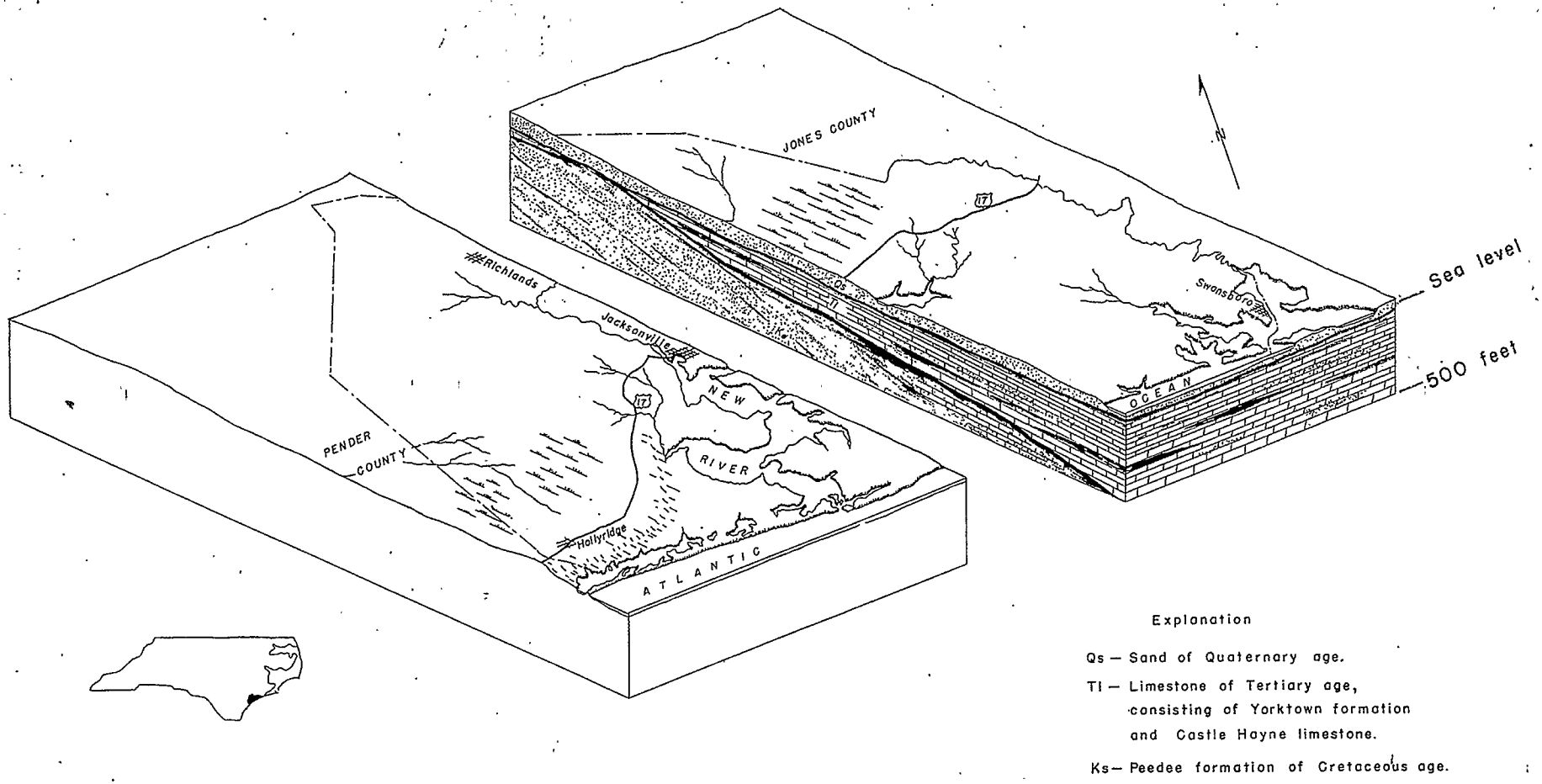


Figure 19. Block diagram of Onslow County showing geologic section cut through a line connecting Richlands and Jacksonville and extending to the ocean.

alarm, as long as the wells are dispersed and the pumping level is controlled.

Onslow County

Number 54

Location Jacksonville, North Carolina in Camp Lejeune just south of N. C. Route 24 at bridge crossing over Northeast Creek.
Owner: Rural Electrification Authority
Date drilled: 1941
Driller: C. W. Laumon Co.
Elevation of well: 22 feet above sea level

Hydrologic Information

Diameter of well: 8 inches
Depth of well: 588 feet
Cased to: 253 feet
Finish: screens
Static (nonpumping) water level: 7 feet below land surface (1941)
Yield: Unknown

Log of Well

Depth (feet)

0-58 No sample.
Post-Miocene (?) surficial sand

58-73 Sand, white; 85 percent fine-grained angular quartz sand. 15 percent white clay matrix, unconsolidated. No microfossils.
Upper (?) Eocene—upper part of Castle Hayne limestone

73-79 Sandy, shell, limestone, white; 35 percent medium to fine-grained subrounded to subangular quartz sand. 25 percent broken partially-recrystalized shell fragments. 40 percent white calcareous matrix, well consolidated and hard. Ostracoda and Foraminifera very rare.

79-83 Calcareous sand, and clay, light-gray; 60 percent medium to fine-grained subrounded to subangular quartz sand. 35 percent calcareous clay matrix, moderately consolidated. 5 percent dark-green fine-grained glauconite. Trace of black phosphate grains. Ostracoda and Foraminifera very rare.

83-88 Sandy, shell limestone, white; 30 percent coarse to medium-grained subrounded water-polished quartz sand. 20 percent coarse broken recrystallized shell fragments. 50 percent white calcareous matrix, well consolidated and hard. Black phosphate pebbles prominent. Ostracoda and Foraminifera rare, recrystallized.
Ostracoda from the 73-88-foot intervals include:
Cytherelloides danvillensis Howe *var.*
Bairdia sp. B.
Cytherura sp. B.
Trachyleberis sp. A.
Cytheretta alexanderi Howe and Chambers

Middle Eocene—lower part of Castle Hayne limestone

88-135 Calcareous sand and clay, light-gray; 75 percent fine-grained angular quartz sand. 25 percent calcareous clay matrix, moderately consolidated. Dark-green glauconite and black phosphate prominent. Ostracoda and Foraminifera rare.

135-199 Calcareous sand and clay, light-gray; Same as 88-135-foot interval with glauconite increasing to 5 percent. Ostracoda and Foraminifera rare.

199-225 Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare.

225-253 Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare.

253-273 Calcareous sand and clay, light-gray; Same as 135-199-foot interval. Ostracoda and Foraminifera rare.
Ostracoda from the 88-253-foot intervals include:
Brachycythere martini Murray and Hussey
Trachyleberis rukasi (Gooch)
Pterygocythereis washingtonensis Swain
Actinocythereis hilgardi (Howe and Garrett)
Actinocythereis stenzeli (Stephenson)
Upper Cretaceous—Peedee formation

273-307 Clay and sand, dark-gray; 40 percent fine to very fine-grained angular quartz sand. 60 percent gray micaceous clay matrix, unconsolidated but compact. Trace of dark-green fiine-grained glauconite pact. Trace of dark-green fine-grained glauconite and broken shell fragments. Ostracoda and Foraminifera very rare.

307-319 Clay and sand, dark-gray; Same as 273-307-foot interval. Ostracoda and Foraminifera very rare.

319-327 Calcareous sand, dark-gray; 75-percent fine-grained angular quartz sand. 25 percent gray calcareous clay matrix, indurated and well consolidated. Dark-green fine-grained glauconite prominent. Trace of broken shell fragments. No microfossils.

327-335 Sand, dark-gray; 80 percent medium to fine-grained angular quartz sand. 15 percent gray clay matrix, unconsolidated. 5 percent dark-green glauconite. Trace of fine mica flakes and broken shell fragments. Ostracoda and Foraminifera rare.

335-367 Sand, dark-gray; Same as 327-335-foot interval. Ostracoda and Foraminifera very rare.

367-388 Sand and clay, dark-gray; 70 percent fine to very fine-grained angular quartz sand. 30 percent gray clay matrix, unconsolidated. Trace of dark-green glauconite and fine mica flakes. Ostracoda and Foraminifera rare.

388-391 Sand, gray; 90 percent medium to fine-grained angular quartz sand. 10 percent gray clay matrix, unconsolidated. Broken and abraded shell fragments prominent. Trace of dark-green glauconite and black phosphate. Ostracoda and Foraminifera common.
Ostracoda from the 273-388-foot intervals include:
Cytherelloidea swaini Brown
Cytheridea (Haplocytheridea) ulrichi Berry
Alatacythere alata atlantica (Schmidt)
Trachyleberis communis (Israelsky)
Platycythereis constatana angula (Schmidt)
Velarocythere eikonata Brown
Velarocythere cacumenata Brown

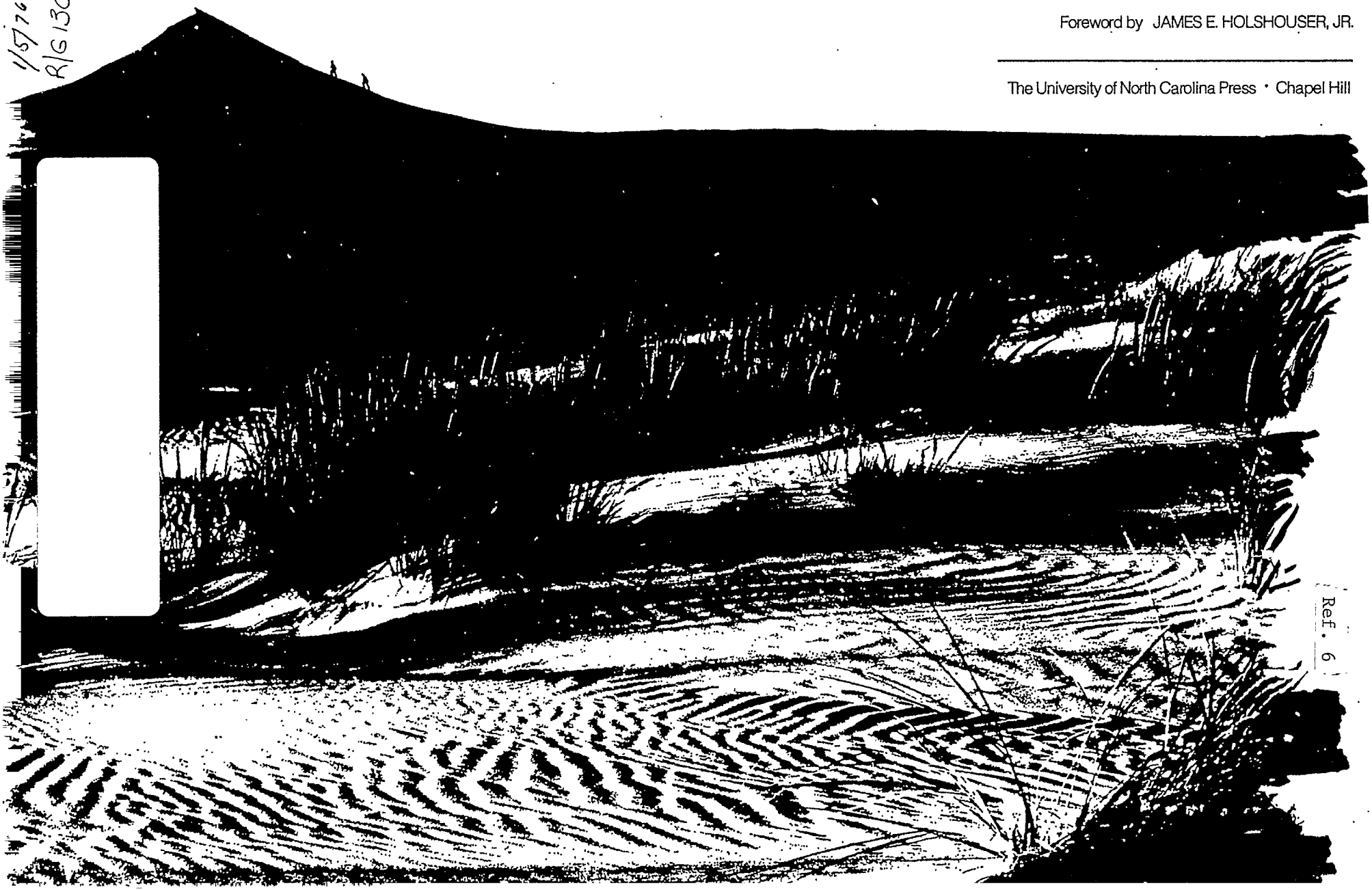
Remarks: No samples are available below a depth of 391 feet.

NORTH CAROLINA ATLAS

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

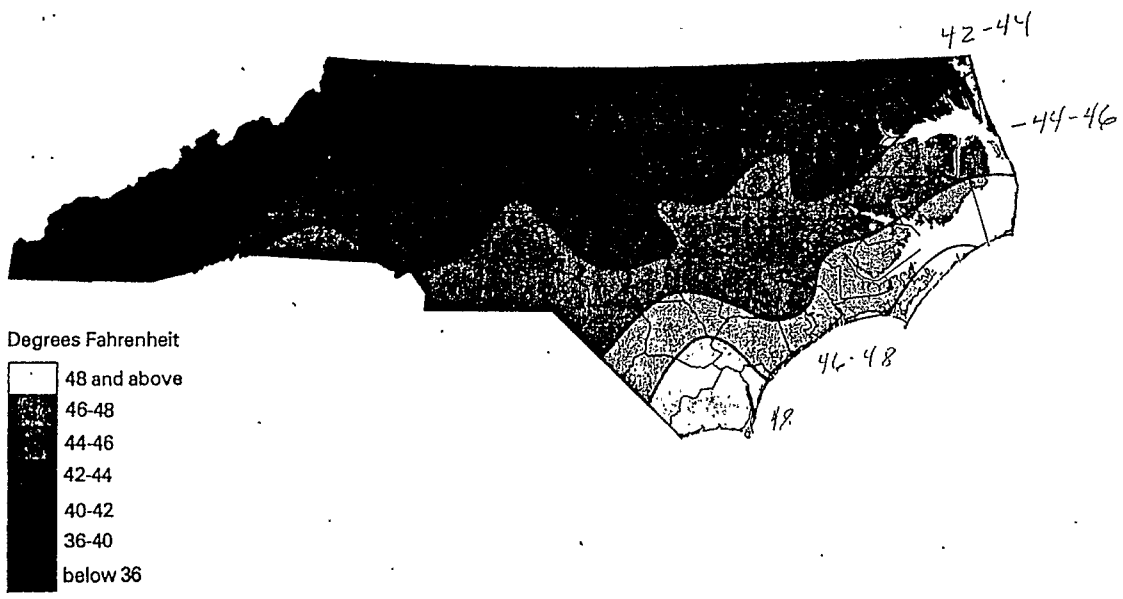
Foreword by JAMES E. HOLSHOUSER, JR.

The University of North Carolina Press • Chapel Hill



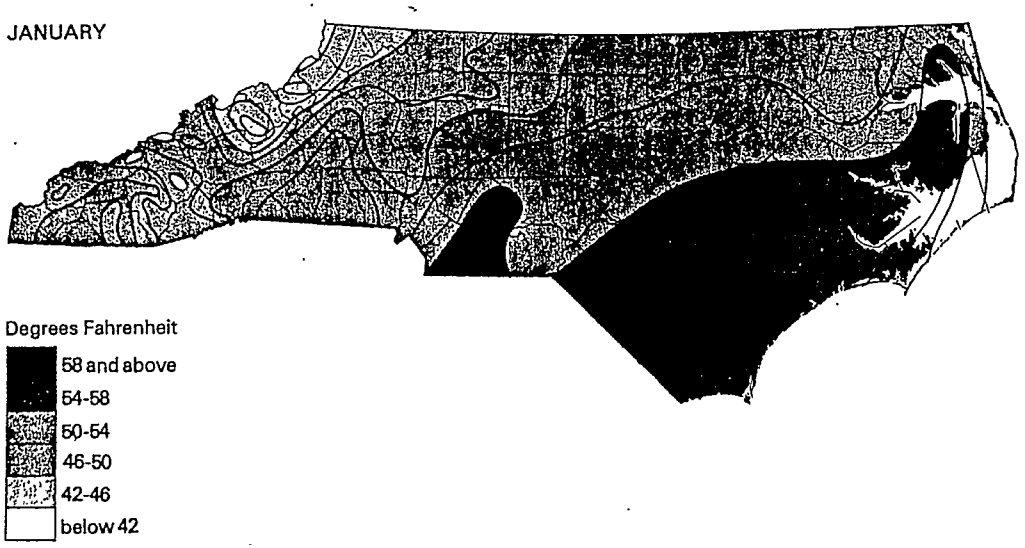
PORTRAIT OF A CHANGING SOUTHERN STATE

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.

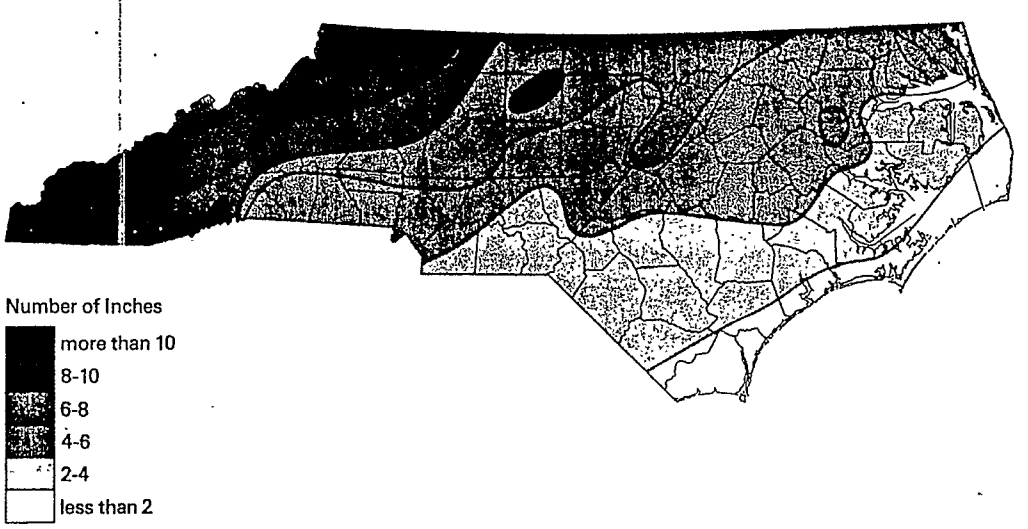
When high-pressure systems (anticyclones) dominate, clear to partly cloudy weather prevails. Receiving, on the average, 50 to 60 percent of total possible sunshine, North Carolina receives more hours of winter sunshine than do states to the north and to the immediate west. Sunshine is more prevalent 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.

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.

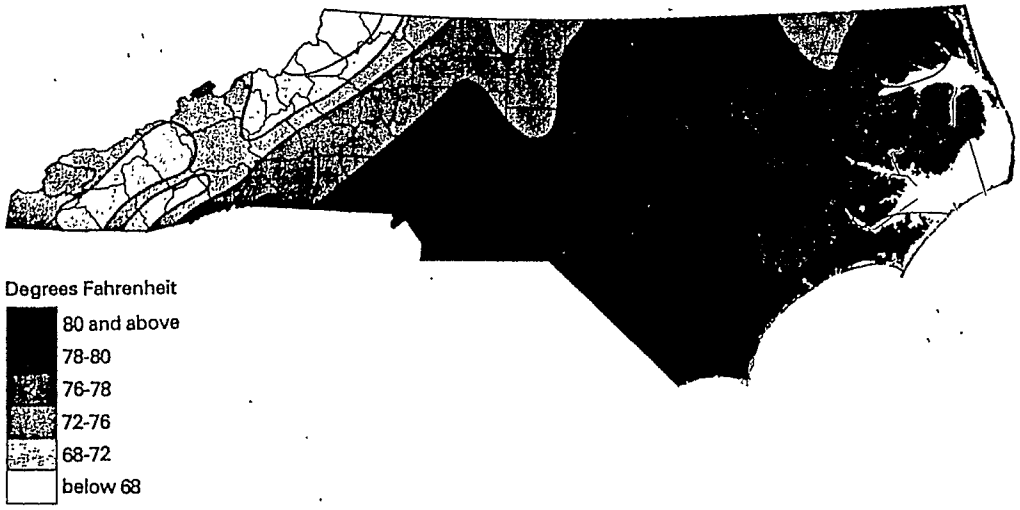


Source: U.S. Department of Commerce, *Climatological Summary,* 1966.

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

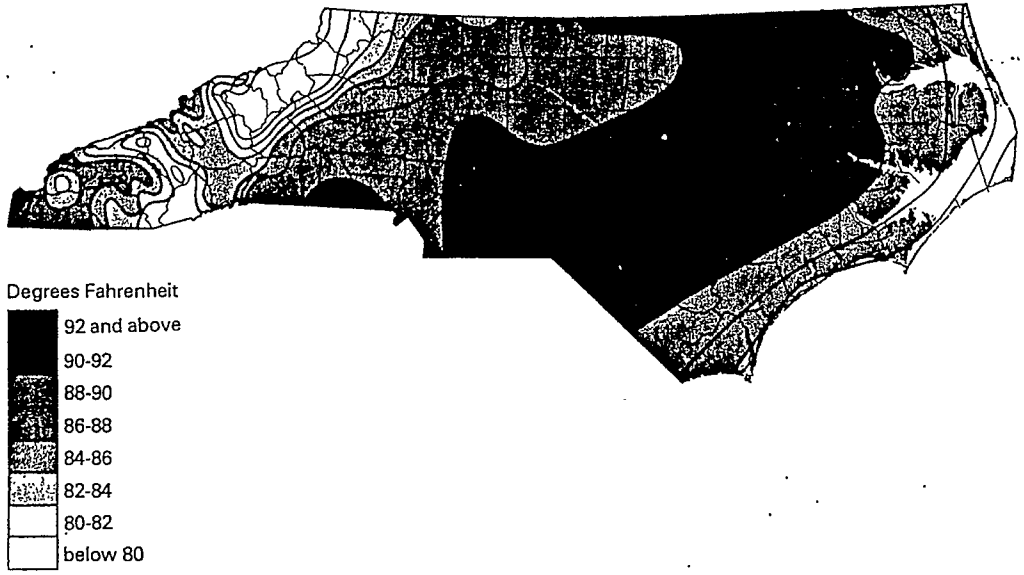
Source: U.S. Department of Commerce, *Weather and Climate in North Carolina,* 1972.

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.

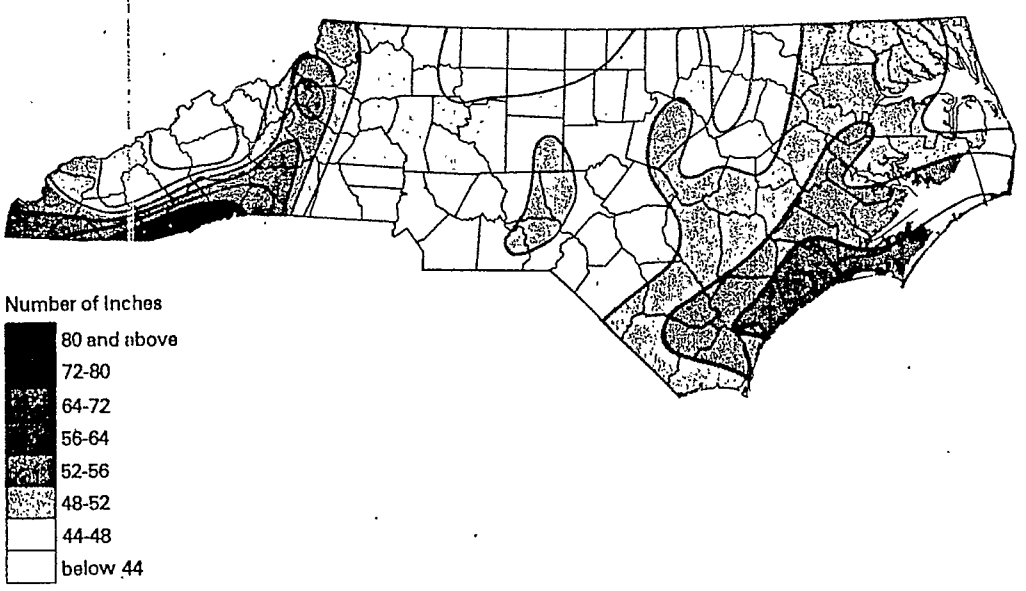
As illustrated in Figure 5.14, freezes begin early in October in the Mountains and slowly move eastward toward the coast. In early December, the freeze-free season reluctantly comes to a close in the Wilmington-Southport area. Deciduous trees begin their dormancy period and the color of the state gradually 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.

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.

Figure 5.15. Average Annual Precipitation in N.C.



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

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

soil moisture requirement is satisfied, additional precipitation will drain to the underground water table or run off the land as surplus water.

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.

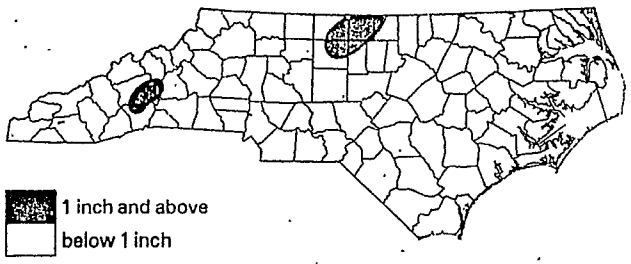
Mean annual evaporation for North Carolina is shown in Figure 5.20. Evaporation rates and totals are related to temperature, wind velocity, and relative humidity. Where temperatures are highest and humidities lowest, evaporation intensities will be greatest. Since temperatures throughout the Coastal 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.

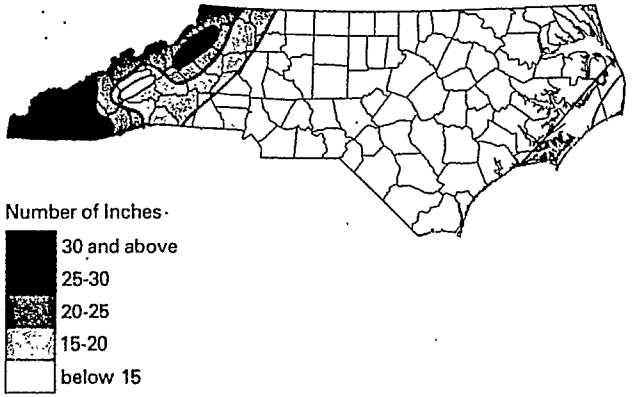
Although prevailing winds (winds that persist in blowing from one direction more so than any other) characterize given geographical areas, wind direction changes frequently. A northwesterly wind (coming from the northwest) will be, relatively speaking, a cooling and drying wind, whereas a southeasterly 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.

Figure 5.18. Water Balance Deficit in N.C.



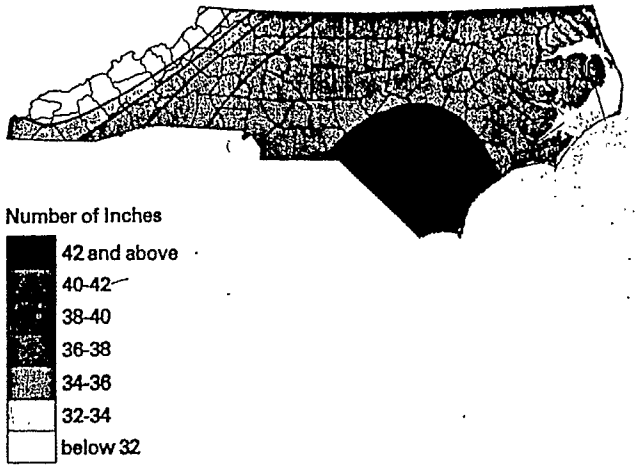
Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

Figure 5.19. Water Balance Surplus in N.C.



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

Figure 5.20. Mean Annual Evaporation in N.C.

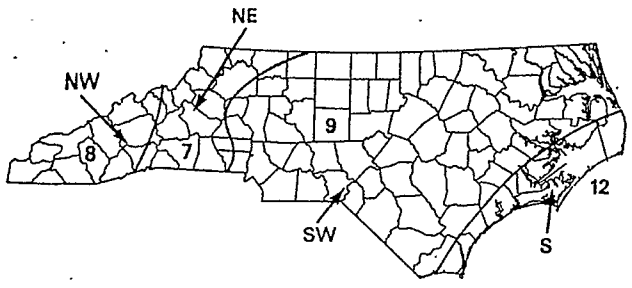


Source: U.S. Department of Commerce, *Climatic Summary of the U.S.*, 1972.

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.

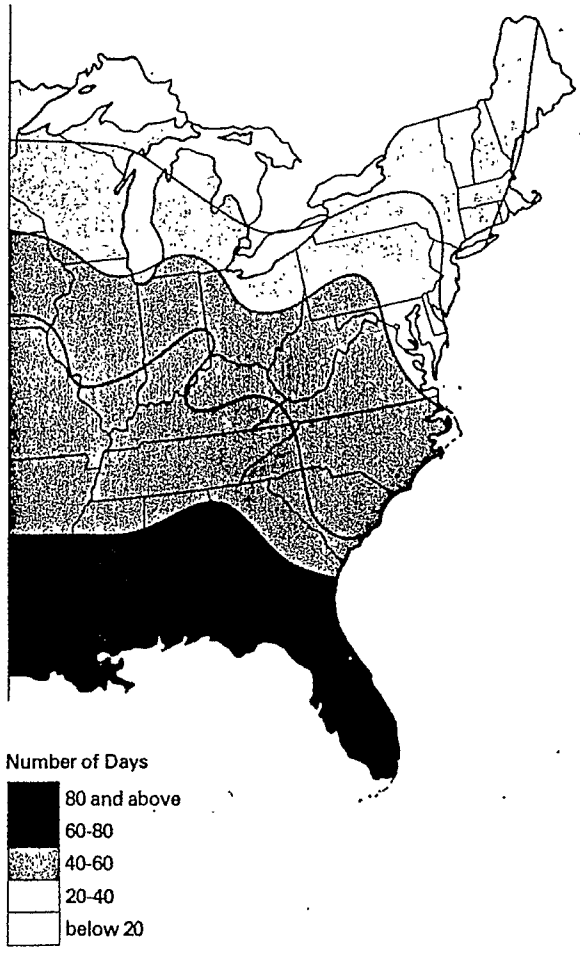
Wind speeds have been averaged for each zone of prevailing winds. Winds tend to diminish in speed westward from the coast where sea breezes and offshore storms contribute to velocities that average twelve miles per hour. Throughout the Inner Coastal Plain and the Piedmont, the mean wind speed is nine 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 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 the storms.

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).

Ref. 7

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

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August 1982

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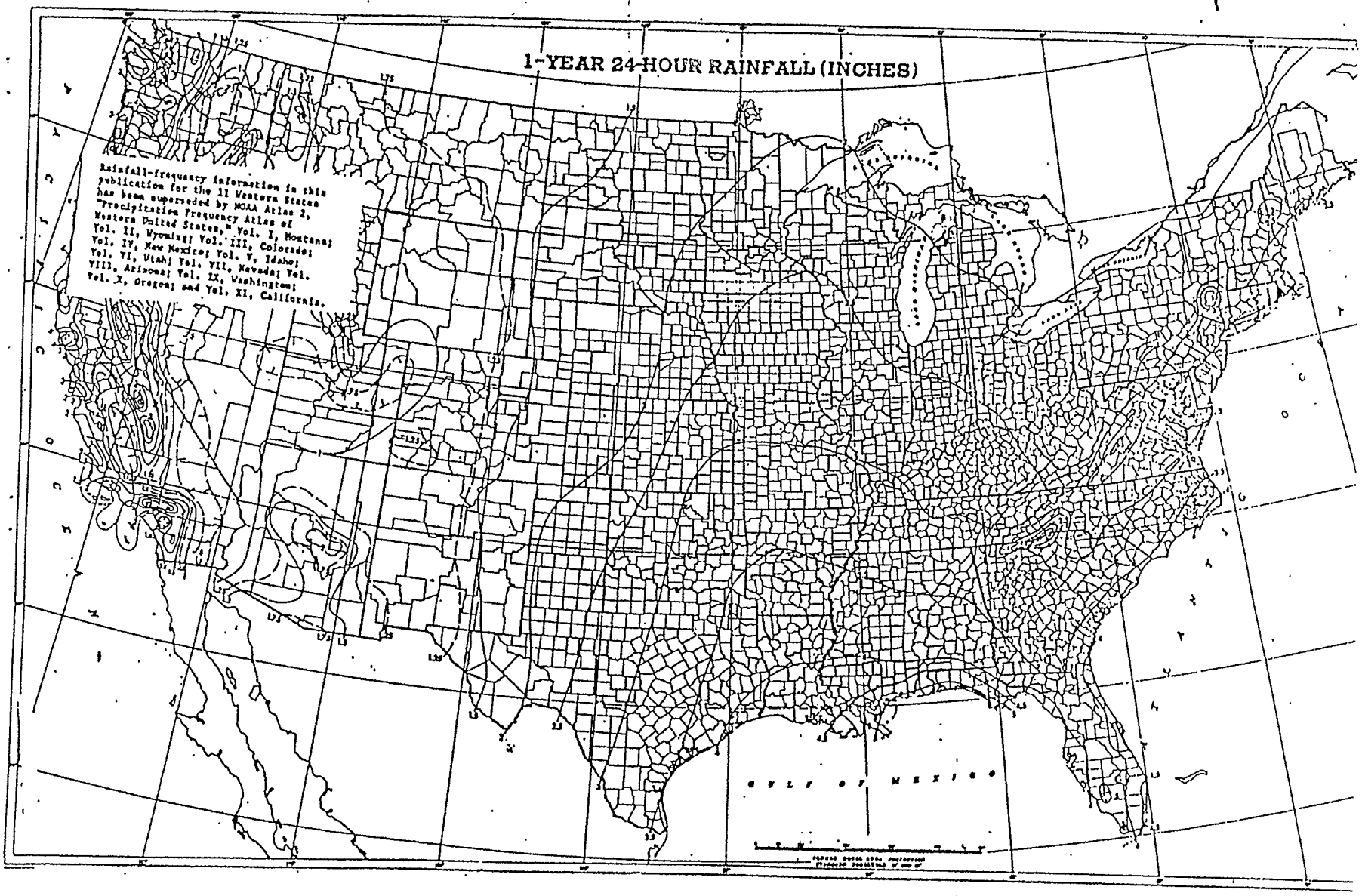
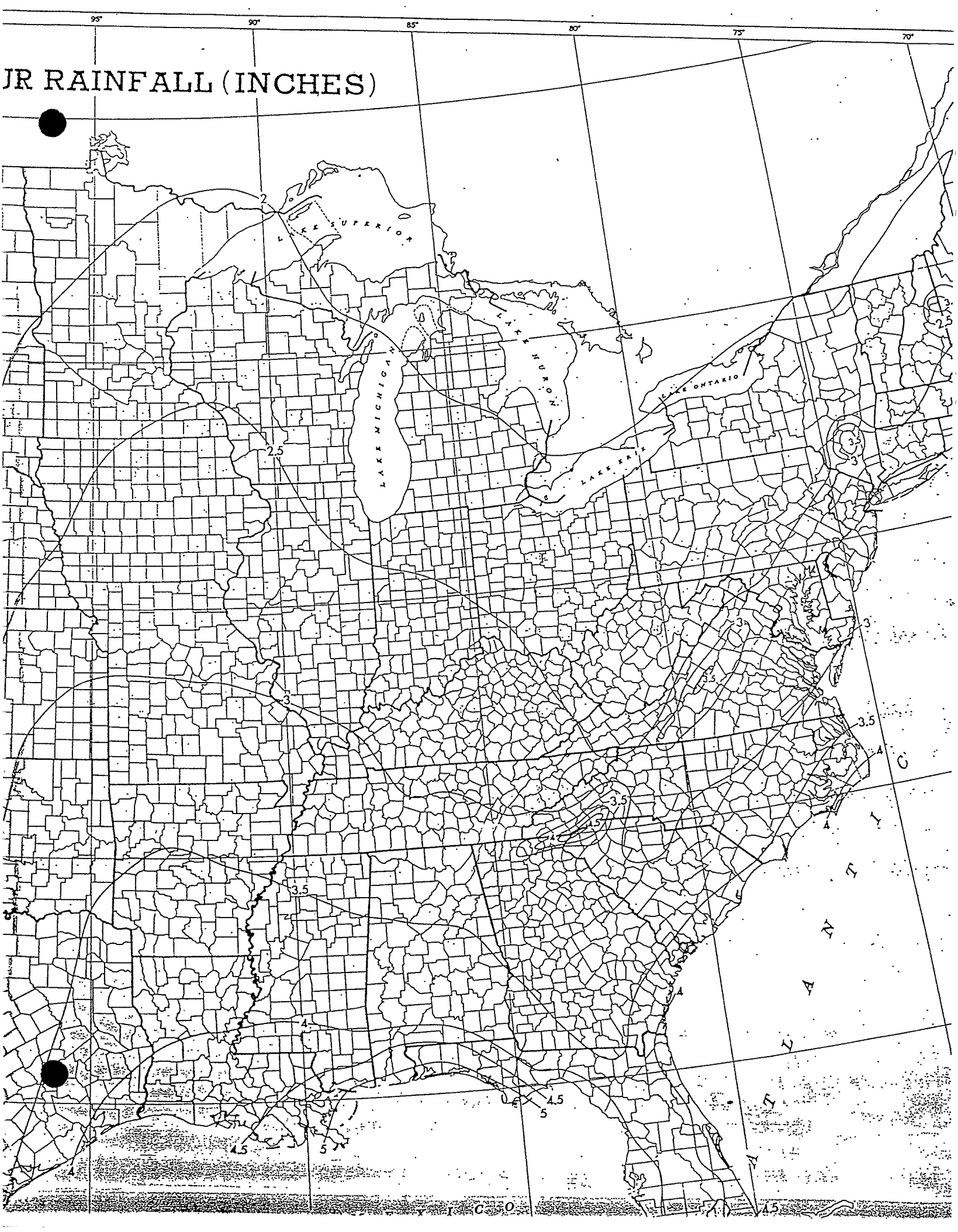

1-YEAR 24-HOUR RAINFALL (INCHES)
Rainfall-frequency information in this publication for the 11 Western States has been superseded by NOAA Atlas 2, "Precipitation Frequency Atlas of Western United States," Vol. I, Montana; Vol. II, Wyoming; Vol. III, Colorado; Vol. IV, New Mexico; Vol. V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; and Vol. XI, California.
GULF OF MEXICO


JR RAINFALL (INCHES)
95°
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85°
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70°
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ONTARIO
LAKE ERIE
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5
A T L A N T I C O

Fifth Edition, 1984

North Carolina State Government

Statistical Abstract

North Carolina State Data Center

Research and Planning Services
Office of State Budget and Management

Table 178

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	7,539	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	568	485	1,528	4,066	671	6,339	1,486	27,446	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	2,428	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	809
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	7,085
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	14,039	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	99,712	186
Franklin	2,850	-	181	-	1,771	-	3,165	83	13,286	-
Gaston	10,171	7,566	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	364	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	358	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	36,601	5,707	156,662	1,758
Mitchell	1,591	124	106	52	780	13	745	520	4,161	1
Montgomery	1,949	365	190	36	1,465	31	3,339	13	9,172	23
Moore	4,418	97	265	71	2,464	46	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	36,483	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	336	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	28	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	23,035	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	146,468	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	36	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	30,285	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 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
Balley	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
Falson	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

Burlington	Alamance	35,930	37,266	3.7
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
Harrells	Duplin, Sampson	249	245	-2.4
Harrellsville	Hertford	165	151	-8.5
Harrisburg	Cabarrus	1,098	1,443	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)	65,229	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

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

City	County Location	1970 Census	1980 Census	Percentage Change
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.

Ref. 9

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

James G. Martin, Governor
David T. Flaherty, Secretary

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

25 April 1988

Ms. Susan Deihl
EPA NC CERCLA Project Officer
EPA Region IV Waste Division
345 Courtland Street, N.E.
Atlanta, GA 30365

Dear Ms. Deihl:

RE: Preliminary Assessment Update
Renroh NC D980728687
Highway 50 and Lloyd Street
Holly Ridge, Onslow County, NC 28445

The Renroh site is located at the corner of Hwy. 50 and Lloyd St. in Holly Ridge, N.C. This is in Onslow County. The county code is 67 and this in the third Congressional District.

In 1977 approximately 2,000 drums of 2,4-dinitrophenol were discovered in a dilapidated U.S. Army gym in Holly Ridge, NC. This building was originally built in the early 1940's as part of Camp David. At the time of the discovery the building was owned by Doug Horner, Renroh, and was being used as a warehouse.

When discovered, the roof of the building had caved in and a number of the drums had broken open. In 1980 the drums were removed under a court order. Most of the drums were moved to Lackey Ind. Whse. (NCd080891039) in Whiteville, NC. Several hundred were reportedly sent to a Renroh warehouse in New Bern, American Cyanamide in Damascus, VA, and some were reportedly shipped to an unknown company in Taiwan. Approximately 100 drums from the Renroh site were discovered in a warehouse owned by Marlow Bostic, NCD982119554, on U.S. 17 about 1 mile north of Holly Ridge.

After the drums were removed from the Renroh site, the property was owned for approximately one year by the City of Holly Ridge who sold it to Allen Hobbs in 1982. The dilapidated building has been removed and the site is presently a vacant lot. The concrete slab floor and fence that was erected around the building after the drum discovery remain on the site..

The depth to the water table on the site is estimated to be about 10 feet. This is based on average depth to the water table in coastal N.C. The annual precipitation in the Holly Ridge area is 56 to 64 inches and the annual evaporation is about 42 inches which yields a net precipitation of 14 to 22 inches. The site is essentially flat and is about 4 miles inland from the coast. The site drains to Cypress Branch approximately 3,000 ft. south of the site. Cypress Branch joins with County Line Branch to form Batts Mill Creek about 2 miles south of the Renroh site. Batts Mill Creek enters the Intercoastal Waterway about 4 miles southeast of Holly Ridge.

The town of Holly Ridge receives water service from Onslow County Water Service which utilizes wells near Richlands approximately 30 miles north of Holly Ridge and a well on NC 210 about 8 miles northeast of Holly Ridge. All areas within the town limits of Holly Ridge are served by this water system. In addition water lines run about 1/2 miles down Hwy. 17 toward Wilmington and about 1 mile on Hwy 50 east toward the beach. A house count on a USGS Topographic Map of the area not served by the town of Holly Ridge indicates 13, 52, 173, and 291 houses within 1, 2, 3, and 4 miles respectively of the Renroh site utilize private wells. Applying a factor of 3.8 residents per house this yields 49,198, 657, and 1106 residents within 1, 2, 3, and 4 miles of the site, that rely on ground water. Study of the topo map also indicates that the nearest house not served by city water is approximately 3,500 feet from the Renroh site.

No further action is recommended at this site due to the fact that the drums and dilapidated warehouse have been removed from the site, and because of low ground water use in the area. If you have any questions, please contact me at (919) 733-2801.

Sincerely,

Jack Butler

Jack Butler, Environmental Engineer
Superfund Branch
Solid Waste Management Section

JB/pb/0576b.36

Ref. 10

22 April 1988

TO: File

FROM: Jack Butler

RE: Water Service within 3 miles of Renroh, NCD980728687.

Mr. O'Neal Gurnanus, Assistant Administrator Onslow County Water Service (919-455-0722) was contacted on this date to obtain information on water service in the Holy Ridge area. Mr. Gurnanus reported that the Onslow County Water Service obtains water from wells near Richlands approximately 30 miles north of Holly Ridge and sells it to the Town of Holly Ridge.

Ms. Joann Odum, Town of Holly Ridge (919-329-7081) confirmed that the town purchases water from the Onslow Co. Water Service and that there were wells near Richlands and on NC 210 (about 8 miles northeast of Holly Ridge). Ms. Odum reported that the town does not have a water distribution map but they serve approximately 250 meters. All areas within Holly Ridge are served and in addition, lines run about 1/2 miles down Hwy. 17 toward Wilmington and about 1 mile on Hwy. 50 east toward the beach.

A house count on a USGS Topographic Map of the area not served by the town of Holly Ridge indicates 13, 52, 173 and 291 houses within 1, 2, 3, and 4 miles respectively of the Renroh site utilize private wells. Applying a factor of 3.8 residents per house this yields 49,198, 657, and 1,106 residents within 1, 2, 3, and 4 miles of the site that rely on ground water. Study of the topo map also indicates that the nearest house not served by city water is approximately 3,500 feet from the Renroh site.

JB/pb/0489b.56.

Ref. 11

May 18, 1989

TO: Superfund Branch Staff

FROM: Pat DeRosa PD

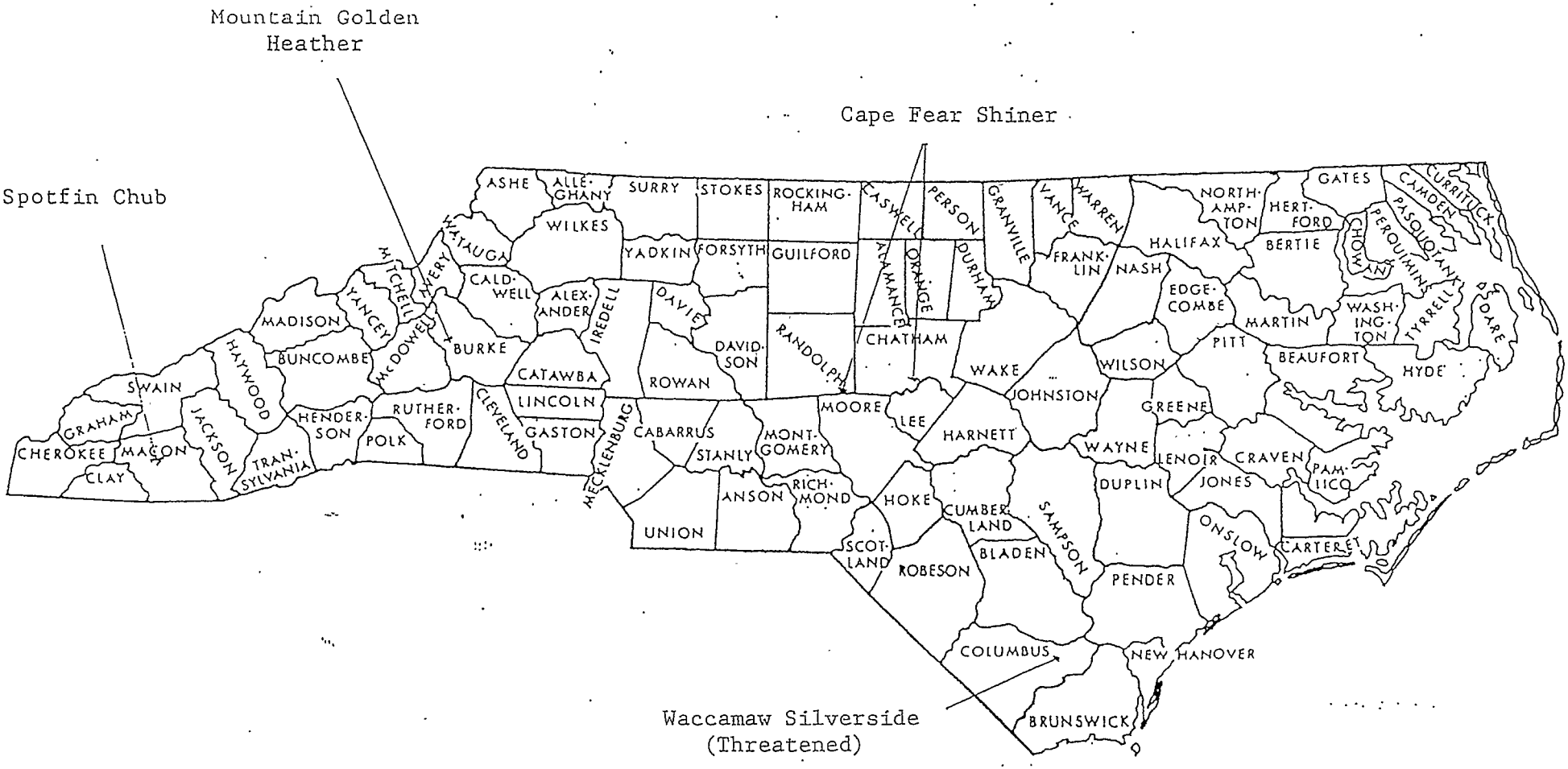
RE: Critical Habitats of Federally Listed Endangered Species in North Carolina

On May 18, 1989, I spoke by telephone with John Fridell, US Fish and Wildlife Service, Asheville, NC (704) 259-0321 to request an update on critical habitats in North Carolina. Mr. Fridell said the Fish and Wildlife Service has been reorganized into a western and eastern office in North Carolina. His office now handles only western North Carolina. He said there have been no changes in the designated critical habitats identified in western North Carolina.

I then spoke by telephone with Debby Mignogno, US Fish and Wildlife Service, Raleigh, NC (919) 856-4520 regarding critical habitats in eastern North Carolina. Ms. Mignogno sent the attached maps of the 2 critical habitats designated in eastern North Carolina. Please note that the Waccamaw Silverside is listed as threatened, not endangered.

PD/pb/critical.hab

CRITICAL HABITATS OF FEDERALLY LISTED ENDANGERED SPECIES IN NC



1 inch = approx. 53 miles

CAPE FEAR SHINER

Notropis mekistocholas

Order: Cypriniformes

Family: Cyprinidae

Status: Endangered (Federal Register 9/25/87)

Range: The Cape Fear shiner is known from four small populations in the Cape Fear River drainage in Randolph, Moore, Lee, Harnett, and Chatham Counties, North Carolina.

The strongest population 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 have been 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.

The second population is located above the Rocky River Hydroelectric Dam. This population was historically the best, but the area yielded only one specimen after extensive surveys by Pottern and Huish (1985). The third population is found in the Deep River system in Randolph and Moore Counties. This population is believed to be small (Pottern and Huish 1985, 1986). In a 1985 survey, 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 fourth population is found in Neal Creek, which flows into the Cape Fear River near Lillington in Harnett County.

Three historic populations have apparently been extirpated: one in Robeson Creek, Chatham County, believed lost when Jordan Lake flooded part of the creek; and one each in Parkers Creek and Kenneth Creek in Harnett County, which disappeared for unknown reasons. Other undiscovered populations or population segments have likely been lost due to reservoir construction in the Deep, Haw, and Cape Fear Rivers.

CAPE FEAR SHINER - N. mekistocholas 6/88

Description: The Cape 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 on plant material, and its digestive tract is modified for this diet by having an elongated, convoluted intestine.

Reasons for Current Status: 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; and changes in flow regulation at existing hydroelectric 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.

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 implemented with the survival of the species and the protection of its habitat in mind.

Habitat: 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 midstream, and in flooded side channels and pools (Pottern and Huish 1985).

Critical Habitat: (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 river mile of Bear Creek, from Chatham County Road 2156 Bridge downstream to the Rocky River, then downstream in the Rocky River (approximately 4.2 river miles) to the Deep River, then downstream in the Deep River (approximately 2.6 river miles) to a point 0.3 river mile 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 river mile upstream of Randolph County Road 2873 Bridge downstream to the Deep River then downstream approximately 4.1 river miles of the Deep River in Randolph and Moore Counties, North Carolina, to a point 2.5 river miles below Moore County Road 1456 Bridge.

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.

Feeding Habits: Plant material forms the primary part of the diet.

Reproduction and Development: No information is presently available on breeding behavior, fecundity, or longevity.

Population Level: Total numbers are unknown, but all populations appear to be small. Surveys conducted in 1984 and 1985 yielded 101 individuals from the population located around the junction of the Rocky River and Deep River in Chatham and Lee Counties, 1 specimen from the Rocky River near State Highway Bridge 902 in Chatham County, and 6 specimens from the Deep River system in Randolph and Moore Counties.

Management and Protection: Assuring survival of the Cape Fear shiner will require, at a minimum, maintaining good water quality and the natural conditions of the remaining habitat. Providing for a higher level of security will necessitate determining limiting factors and reestablishing additional populations into suitable waters within the historic range.

References:

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. 1986. 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.

CAPE FEAR SHINER - N. mekistocholas 6/88

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

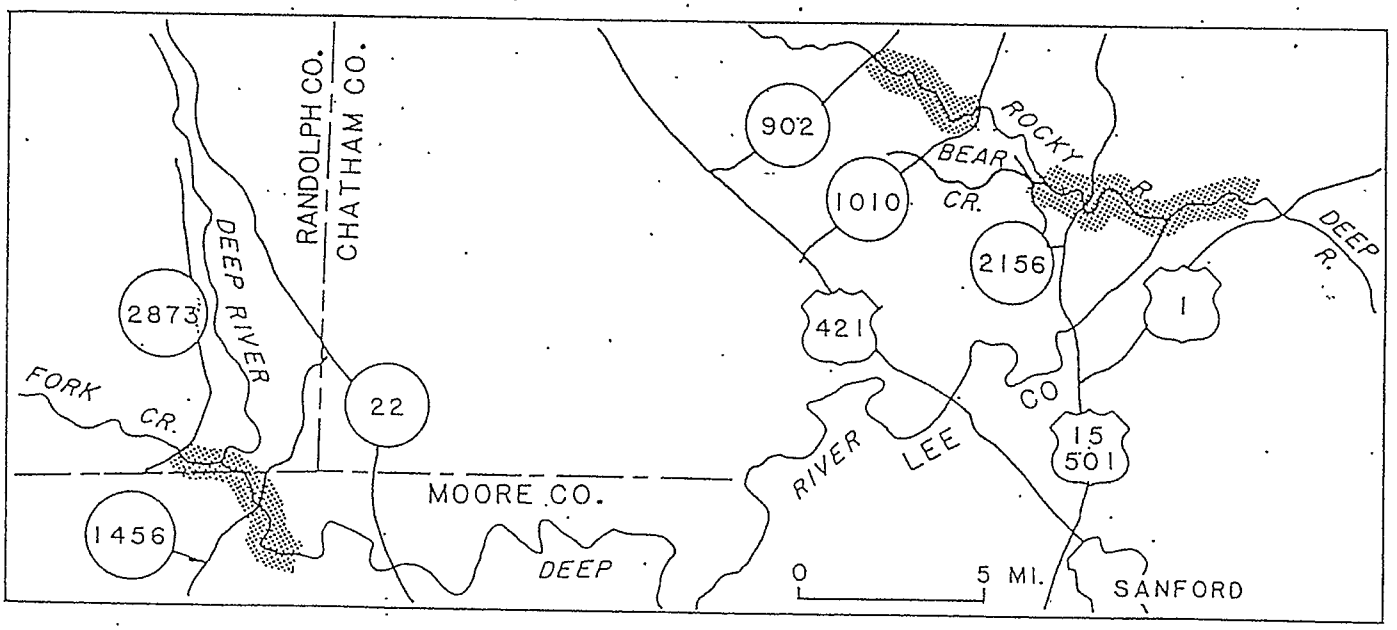
U.S. Fish and Wildlife Service. 1987. Endangered and threatened wildlife and plants; determination of endangered species status and designation of critical habitat for the Cape Fear shiner. Federal Register 52(186):36034-36039.

NORTH CAROLINA - Critical Habitat

Notropis mekistocholas, "Cape Fear shiner"

(1) 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) Chatham and Lee Counties. Approximately 0.5 river mile of Bear Creek, from Chatham County Road 2156 Bridge downstream to the Rocky River, then downstream in the Rocky River (approximately 4.2 river miles) to the Deep River, then downstream in the Deep River (approximately 2.6 river miles) to a point 0.3 river mile below the Moncure, North Carolina; U.S. Geological Survey Gaging Station; and
(3) Randolph and Moore Counties. Approximately 1.5 miles of Fork Creek, from a point 0.1 river mile upstream of Randolph County Road 2873 Bridge downstream to the Deep River then downstream approximately 4.1 river miles of the Deep River in Randolph and Moore Counties, North Carolina, to a point 2.5 river miles below Moore County Road 1456 Bridge.

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.



7/87

WACCAMAW SILVERSIDE

Menidia extensa

Order: Mugiliformes

Family: Atherinidae

Status: Threatened (Federal Register 4/8/87)

Range: Known only from Lake Waccamaw and the upper Waccamaw River in Columbus County, North Carolina. The silverside is found in the upper Waccamaw River only during periods of high water and is not a permanent resident. Lake Waccamaw (not to be confused with the town of Lake Waccamaw) is the property of the State of North Carolina and is administered by the North Carolina Department of Natural Resources and Community Development's Division of Parks and Recreation.

Description: The Waccamaw silverside, also known as "skipjack" or "glass minnow," is a small (growing to about 2.5 inches), slim, almost transparent fish with a silvery stripe along each side. Its body is laterally compressed, the eyes are large, and the jaw is sharply angled upward.

Reasons for Current Status: The primary threat is the deterioration of water quality in Lake Waccamaw resulting from nutrient buildup. Although specific sources are currently unidentified, runoff and leachate from surrounding development may be contributing to the buildup. Nutrients in the lake increased since 1973, and it now appears that any further increase could tip the scales toward water quality conditions that would threaten the species. The existing data, as interpreted by Casterlin et al. (1986), indicate that phosphate concentrations and loading rates in the lake more than tripled in the years between 1973 and 1981. They further state that "continued high rates of phosphorus input (organic pollution) will likely bring the lake to a hyper-eutrophic state . . . by the end of the century." Water quality could also be affected by habitat alteration from development and other changes in land use, both around the lake and in its watershed (especially Big Creek), if these activities are not planned and implemented with the protection of the Lake Waccamaw ecosystem in mind.

A permit to propagate hybrid bass at several sites in the Lake Waccamaw watershed has been granted by the North Carolina Wildlife Resources Commission. Although the permit stipulates certain precautionary measures, escape of non-native predators from such a project into the system could upset the existing predator-prey relationships in the lake to the detriment of the Waccamaw silverside and other fishes now present in the lake.

A final factor that could threaten the Waccamaw silverside relates to its very short life cycle. The fish spawn when one-year-old and most die shortly thereafter. Failure to spawn in any one year could jeopardize the species. Water quality problems related to nutrient loading, even on a short-term basis, could cause the extinction of this fish.

WACCAMAW SILVERSIDE - M. extensa

Habitat: Lake Waccamaw is a natural lake with an approximate surface area of 8,934 acres and an average depth of 7.5 feet. Although it is fed by acidic swamp streams, the lake has a virtually neutral pH. This neutral condition, unusual among North Carolina's coastal plain lakes, is believed to be caused by the buffering effect of the calcareous Waccamaw Limestone formation, which underlies the lake and is exposed on the north shore. The Waccamaw silverside inhabits open water throughout the lake, where schools are commonly found near the surface over shallow, dark-bottomed areas.

Critical habitat: North Carolina, Columbus County. Lake Waccamaw in its entirety to mean high water level, and Big Creek from its mouth at Lake Waccamaw upstream approximately 0.6 kilometers (0.4 miles) to where the creek is crossed by County Road 1947.

Constituent elements include high quality clear open water, with a neutral pH and clean sand substrate.

Reproduction and Development: Spawning occurs from April through June, but reaches to peak when water temperatures are between 68 and 72F. Fully developed larvae form small isolated schools by early May. No parental care of the young has been noted. The silversides reach sexual maturity by the following spring, spawn, and then shortly thereafter most of the adults die off. A few may survive a second winter.

Population level: Estimated to be in the millions.

Management (Activities, Recommendations, Implications): The taking of silversides for fish bait or for scientific purposes is not considered a threat to the species. These activities may continue in accordance with State regulations. Activities which could affect water and substrate quality by increasing siltation and/or nutrient loading, or by altering temperature or pH, will require monitoring and control as necessary and feasible. Some of the activities that could prove detrimental include indiscriminate logging, land use changes, stream alteration such as channelization or impoundment, bridge and road construction, improper pesticide/herbicide application, and point and nonpoint pollution discharge.

References:

Casterlin, M.E., W.W. Reynolds, D.G. Lindquist, and C.G. Yarbrough. 1986. Algal and Physicochemical Indicators of Eutrophication in a Lake Harboring Endemic Species: Lake Waccamaw, North Carolina. Journal of the Elisha Mitchell Scientific Society 100(3):83-103.

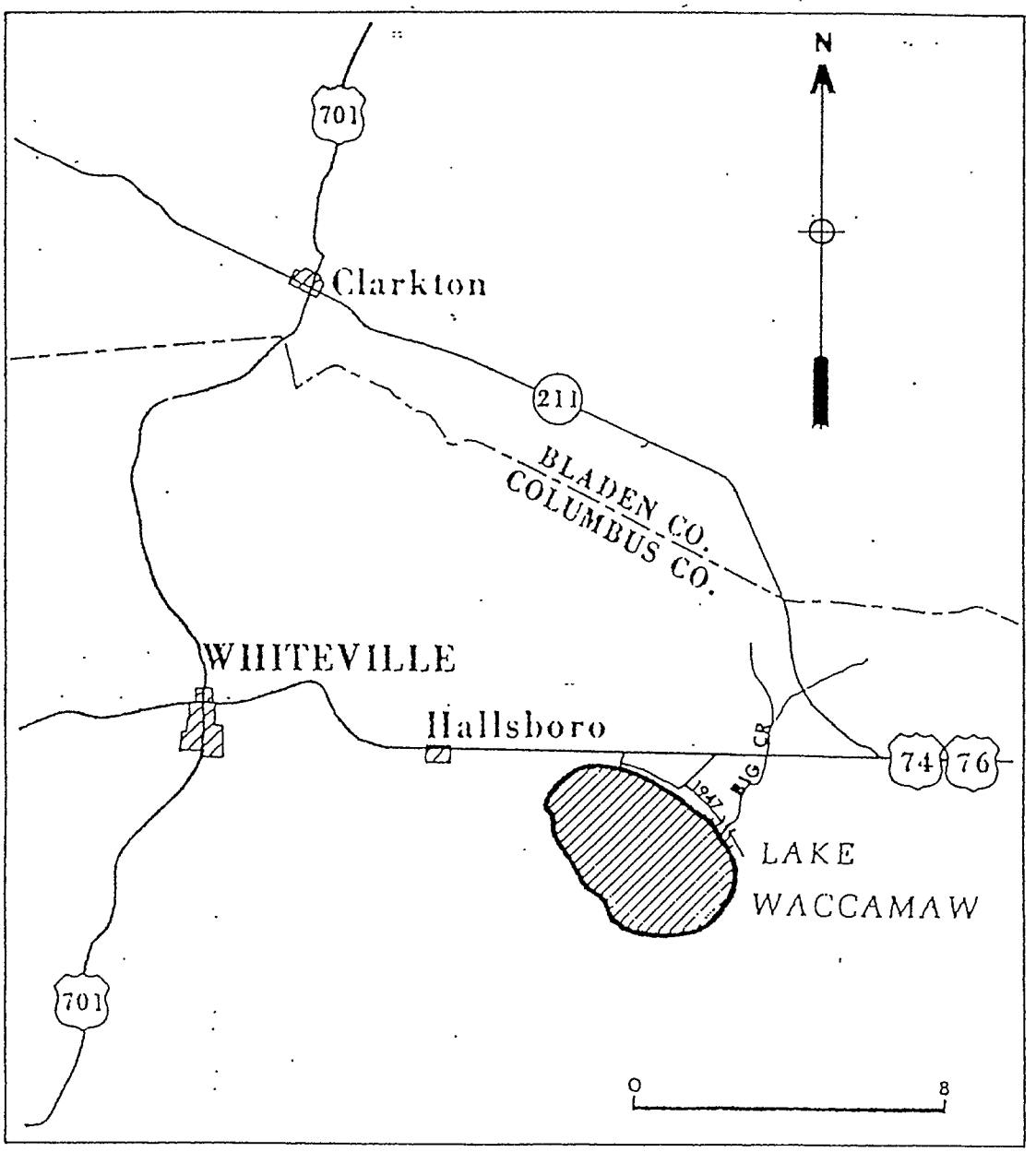
Davis, J.R. and D.E. Louder. 1969. Life History of Menidia extensa. Transactions of the American Fisheries Society 98(3):466-472.

NORTH CAROLINA - Critical Habitat

Menidia extensa, "Waccamaw silverside"

Columbus County. Lake Waccamaw in its entirety to mean high water level, and Big Creek from its mouth at Lake Waccamaw upstream approximately 0.6 kilometer (0.4 mile) to where the creek is crossed by County Road 1947.

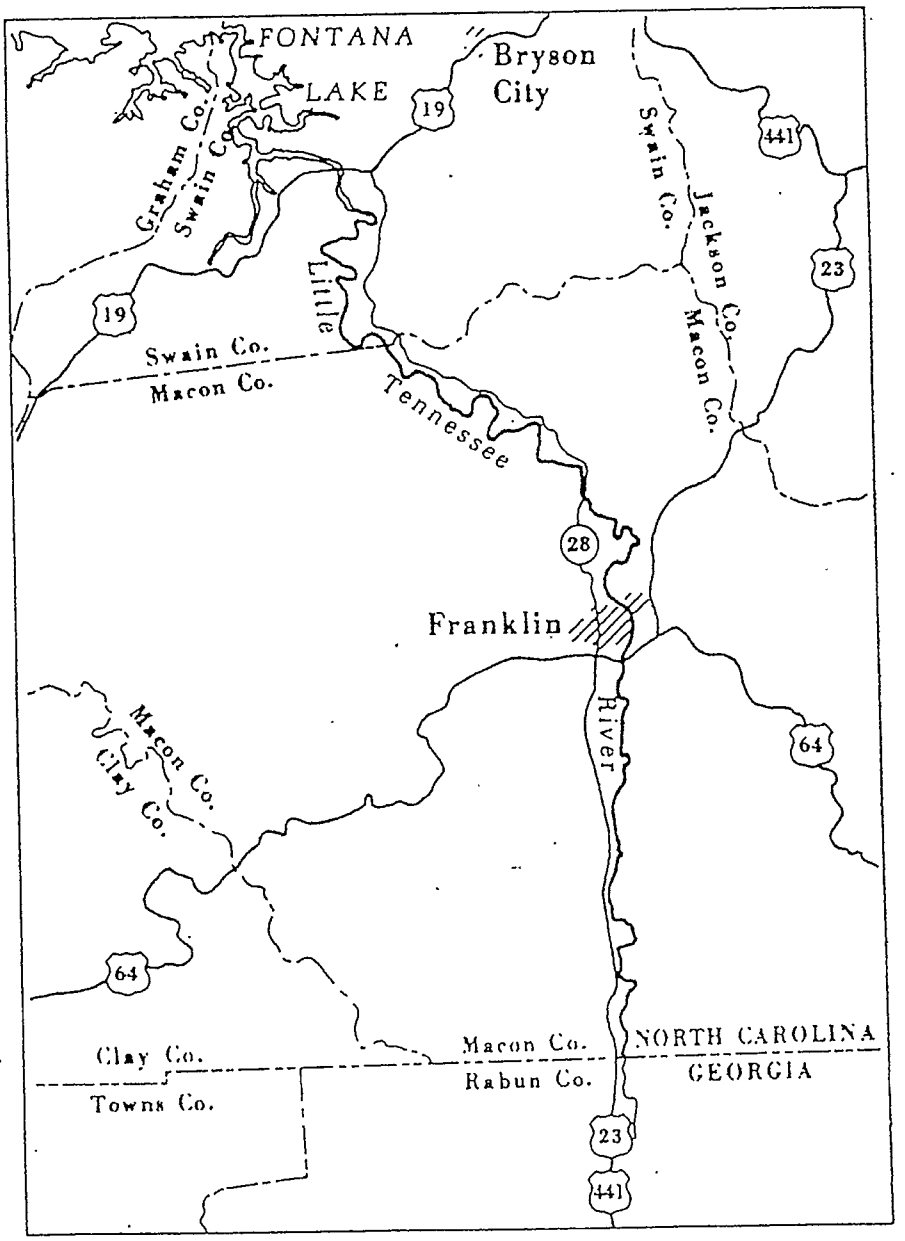
Constituent elements include high quality clear open water, with a neutral pH and clean sand substrate.



NORTH CAROLINA - Critical Habitat

Hybopsis monacha, "spotfin chub"

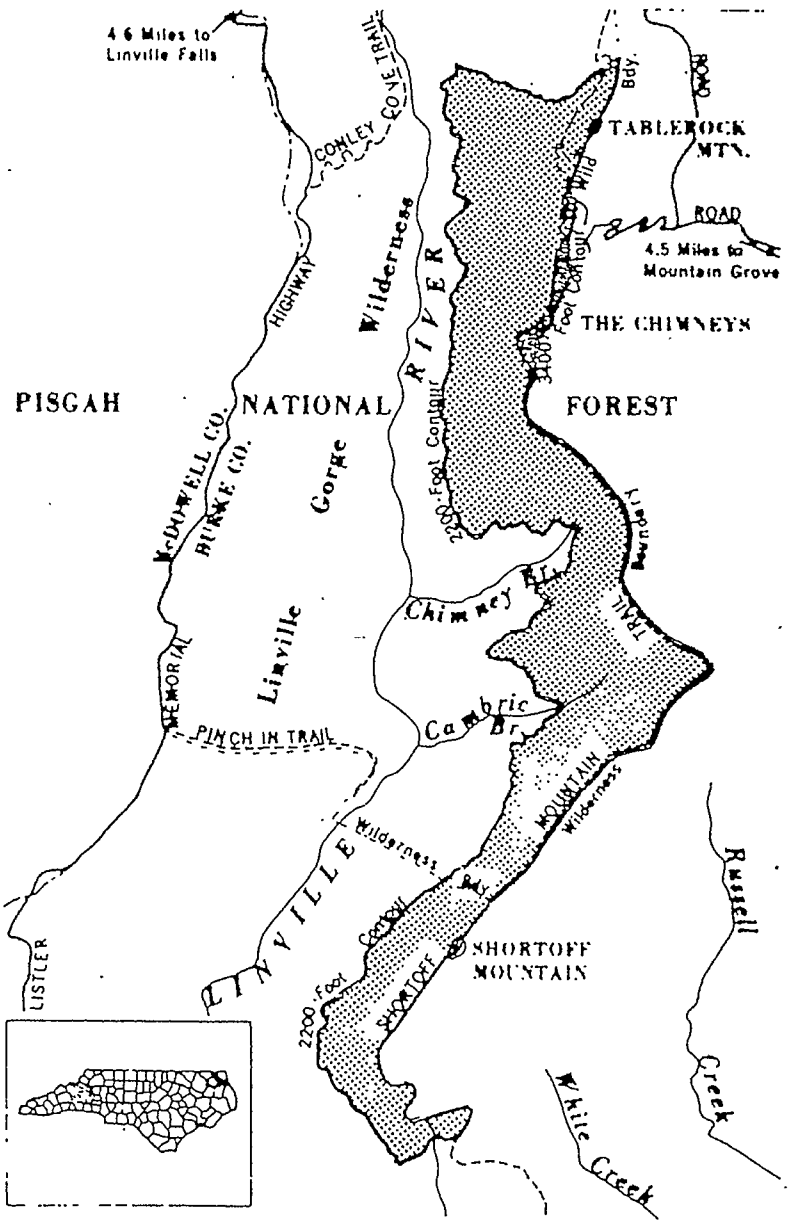
Macon and Swain Counties. Little Tennessee River, main channel from the backwaters of Fontana Lake upstream to the North Carolina-Georgia state line.



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.



Dangerous Properties of Industrial Materials

Sixth Edition

N. IRVING SAX

Assisted by:

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

VAN NOSTRAND REINHOLD COMPANY
New York

2,4-DINITROPHENOL

CAS RN: 51285 NIOSH #: SL 2800000
mf: $C_6H_4N_2O_5$; mw: 184.12

Yellow crystals. mp: 112°, d: 1.683 @ 24°, vap. d: 6.35.

SYNS:

2,4-DINITROFENOL (DUTCH)
DINITROFENOLO (ITALIAN)
ALPHA-DINITROPHENOL
1-HYDROXY-2,4-DINITROBENZENE
NSC 1532

TOXICITY DATA: 3	CODEN:
cyt-mus-ipr 10 gm/kg	IJMRAQ 59,1442,71
orl-rat TDLo:2040 mg/kg (8D pre-21D post)	PSEBAA 32,678,35
ipr-mus TDLo:40800 ug/kg (10-12D preg)	FCTXAV 11,31,73
skn-rbt 300 mg/4W-I MLD	JIHTAB 30,10,48
mmo-esc 200 ppm/3H	AMNTA4 85,119,51
orl-hmn LDLo:4300 ug/kg	JAMAAP 101,1333,33
orl-rat LD50:30 mg/kg	TXAPA9 21,315,72
ipr-rat LD50:20 mg/kg	JPPMAB 17,814,65
scu-rat LD50:25 mg/kg	JPETAB 49,187,33
unk-rat LD50:27 ug/kg	FMCHA2 -,D107,80
orl-mus LD50:45 mg/kg	FATOAO 28,493,65
ipr-mus LD50:26 mg/kg	BCPCA6 18,1389,69
orl-dog LDLo:30 mg/kg	JPETAB 49,187,33
scu-dog LDLo:20 mg/kg	JPETAB 49,187,33
ivn-dog LDLo:15 mg/kg	JPETAB 49,187,33
orl-rbt LD50:30 mg/kg	FATOAO 28,493,65
scu-rbt LDLo:20 mg/kg	JPETAB 49,187,33
orl-gpg LD50:81 mg/kg	FATOAO 28,493,65
skn-gpg LDLo:700 mg/kg	JIHTAB 30,10,48
scu-gpg LDLo:25 mg/kg	AEPPAE 192,331,39
ims-pgn LDLo:7500 ug/kg	JPETAB 49,187,33
unk-mam LD50:40 gm/kg	30ZDA9 -,97,71
orl-bwd LD50:13 mg/kg	TXAPA9 21,315,72

Aquatic Toxicity Rating: TLm96:10-1 ppm WQCHM* 4,-,74. *Toxicology Review:* 31ZNAA 1(1),93,71. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.

THR: MUT data. A skn irr. HIGH orl, ipr, scu, unk, ims. Phytotoxic. See also nitrates.

Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

For further information see Vol. 2, No. 2 of *DPIM Report.*

Appendix D

Site Inspection Form

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

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980728687

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Renroh	Highway 50 and Lloyd Street

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Holly Ridge	NC	28445	Onslow	67	3

09 COORDINATES LATITUDE	LONGITUDE
34° 29' 51"	77° 33' 22"

10 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
8 / 8 / 89 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	~1973 (BEGINNING YEAR) / 1980 (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)
☒ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Jack Butler	Environmental Engineer	NC Superfund	(919) 733-2801
09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Ed Wallingford	Environmental Chemist	NC Superfund	(919) 733-2801
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Les Haste	Onslow Co. Health Dept.	612 College Street Jacksonville, NC 28540	(919 347-2154
Sam Frazelle	Onslow Co. Health Dept.	612 College Street Jacksonville, NC 28540	(919 347-2154
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	A.M.	Clear, hot

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Allen Hobbs	Owner of Property	(919) 329-5511

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Jack Butler	NC DEHNR	Superfund Section	919-733-2801	10 17 89 (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: NC	02 SITE NUMBER: D980728687

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: 2,000
- NO. OF DRUMS:

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [ ] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [X] 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	2,000	Drums	2,4-Dinitrophenol
IOC	INORGANIC CHEMICALS			
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-Dinitrophenol	51-28-5	Drums	Unknown	

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. USGS, 7.5' Quad., Holly Ridge Quadrangle, 1970.
2. Permanent Files, NC Solid And Hazardous Waste Management Branch, Raleigh, North Carolina.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

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: _____ (Acres)
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

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	D980728687

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: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

No contamination found remaining on site.

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

As previously sited.

EPA FORM 2070-13 (7-81)

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

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	2,000	Drums
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ 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 Removal (Specify)

05 OTHER

- ☐ A. BUILDINGS ON SITE

06 AREA OF SITE

2.5 (Acres)

07 COMMENTS

Removal occured on site in 1980. No contamination found remaining on site.

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.

Approximately 2,000 drums of 2,4-Dinitrophenol have been removed from the site.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS

Wastes no longer present.

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

As previously sited.

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980728687

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. 30 (mi)
B. 0.25 (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 657

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.25 (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
15 (ft)	Unknown	15 (ft)	Unknown (gpd)	☒ YES ☐ NO

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

Three wells serve meat processing plant approximately 1300 feet from site to wash down equipment.

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
Cypress Branch	☐	0.5 (mi)
	☐	(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. 514 NO. OF PERSONS	B. 663 NO. OF PERSONS	C. 1122 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 175

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)*

All of the town of Holly Ridge (population 465; 1980 census) is within one mile of 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	D980728687

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	
unknown (ft)	None (ft)		

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
22-30 (in)	3.5-4.0 (in)	0 %	None	0 %

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	OTHER
A. _____ (mi)	B. 1 (mi)

12 DISTANCE TO CRITICAL HABITAT *(of endangered species)*

60 (mi)

~~ENDANGERED~~ Threatened SPECIES: Waccamaw Silverside

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. 0.1 (mi)	B. 0.1 (mi)	C. _____ (mi)	D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is essentially flat.

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

As previously sited.

EPA

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

I. IDENTIFICATION	
01 STATE: NC	02 SITE NUMBER: D 980728687

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL	4	NC DHR/DHS	
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF North Carolina Superfund Section
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS North Carolina Superfund Section

V. OTHER FIELD DATA COLLECTED *(Provide narrative description)*

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

As previously sited.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
Allen Hobbs	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Rt. 2, Box 229	

05 CITY	06 STATE	07 ZIP CODE
Holly Ridge	NC	28445

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

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

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

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

As previously sited.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

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

01 NAME	02 D+B NUMBER
None	

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

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
Doug Horner	

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

PREVIOUS OPERATORS' PARENT COMPANIES *(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

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 sited.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE / 07 ZIP CODE	

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 sited.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

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 1980 — 03 AGENCY _____
04 DESCRIPTION Approximately 2,000 drums of 2,4-dinitrophenol removed in 1980 under a court order.

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 _____ — 03 AGENCY _____
04 DESCRIPTION

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

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980728687

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 sited.

EPA

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

I. IDENTIFICATION	
01 STATE: NC	02 SITE NUMBER: D980728687

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION: [X] YES [ ] NO

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

In 1980 approximately 2,000 drums of 2,4-dinitrophenol phenol were removed from the site by the owner under a court order.

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

As previously sited.

Appendix E

Site Safety Plan

SITE HEALTH AND SAFETY PLAN

A. General Information

Site Name Renroh ID # NCD 980 728 687

Location Highway 50 and Lloyd Street, Holly Ridge, Onslow County, NC Date July 21, 1989

Proposed Date of Investigation August 8, 1989

Date of Briefing August 7, 1989

Date of Debriefing August 9, 1989

Site Investigation Team: All site personnel have read the Site Health and Safety Plan and are familiar with its provisions.

	Personnel	Responsibilities	Signature
Team 1	Jack Butler	team leader, sampling	Jack Butler
Team 1	Ed Wallingford	sampling	
Team 2			
Team 2			

Plan Preparation:

Prepared By: David Lilley, Industrial Hygienist David Lilley

Reviewed By: Jack Buter, Environmental Engineer Jack Butler

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	WARNING PROPERTIES	TLV
2,4-dinitrophenol	Odor Threshold = No Data	0.2mg/m^3

ID # NCD 980 728 687

Facility Description: Size unknown Buildings none known
Disposal Methods Being Investigated Drums were removed from a building. The building has been demolished, but possible contamination remains.
Unusual Features on Site (dike integrity, power lines, terrain, etc.):
None known

History of the Site: In 1977, approximately 2,000 drums of 2,4-dinitrophenol were discovered in a dilapidated U.S. Army gym. When discovered, the roof of the building had caved in and a number of the drums had broken open. In 1980, the drums were removed. The dilapidated building has been removed and the site is presently a vacant lot. The concrete slab floor of the building and fence that was erected around the building after the drum discovery remain on the site.

C. HAZARD EVALUATION

The site can be toured and sampled in level D. PE or PVC gloves will be worn while taking soil samples, and PE or PVC gloves will be worn while collecting water and sediment samples. Tyvek suits (saranex in wet conditions) are recommended to keep clothing clean.

D. WORK PLAN INSTRUCTION

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

Personal Protective Equipment

Level of Protection ____C X D

Modifications Wear goggles and PVC gloves while preparing acid preserved samples. Avoid breathing acid vapors.

ID # NCD 980 728 687

Surveillance Equipment:

_____ HNU	_____ Detector Tubes and Pumps
_____ OVA	_____ 02 Meter
_____ Explosimeter	_____ Radiation Monitor

Decontamination Procedures

_____Level C Respirator wash, respirator removal, suit wash (if needed,) suit removal, boot wash, boot removal and glove removal.

__X__Level D Boot wash and rinse and boot removal, suit removal, glove and goggle removal.

Modifications Dispose of trash properly, on-site if possible.

Work Schedule/Visit Objectives The objective is to determine if all the contamination has been removed from the site. Sampling will consist of surface soil sampling, and (if available) drinking water well sampling, surface water sampling, and sediment sampling.

EMERGENCY PRECAUTIONS

Route of Exposure	First Aid
Eyes	irrigate immediately
Skin	soap and water wash
Inhalation	fresh air and artificial respiration
Ingestion	get medical attention immediately

ID # NCD 980 728 687

Location of Nearest Phone: nearby residences-this is NOT an operating site

Hospital (Address and Phone Number)

Onslow Memorial Hospital, 317 Western Blvd., Jacksonville, NC 28540

(919) 577-2345 - can handle chemically contaminated patients

Emergency Transportation Systems (Phone Numbers)

Fire 911

Ambulance 911

Rescue Squad 911

Emergency Route to Hospital Take route 17 North and go through Jacksonville. Approximately 3 miles on the other side of Jacksonville, take a right onto Western Blvd. The hospital will be on the right.

PREVAILING WEATHER CONDITIONS AND FORECAST High near 80, chance of rain.

EQUIPMENT CHECKLIST

___	Air purifying respirator	X	First Aid Kit
___	Cartridges for respirator	X	3 gal. Distilled H20
X	Rainsuit	X	Gloves (PE/PVC/nitrile/cloth)
___	02 Indicator	X	Boots/Boot Covers
___	Eye Wash Unit	X	Coveralls (tyvek/saranex)
___	H Nu	X	Eye Protection
___	pH Meter	X	Hard Hat
___	Explosimeter	X	Decontamination
___	Radioactive Monitor		Materials.
___	Detector Tubes and Pump		

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. Med. Center Box 3007, 27710	JACKSONVILLE 919-577-2555	Onslow Mem. Hospital Western Blvd. 28540
GREENSBORO [redacted]-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
safeform.001

TO BE COMPLETED BY PROJECT MANAGER

PROJECT MANAGER: Jack Butler PROJECT: Renroh

Materials Used

_____ Air Purifying respirator cartridges
_____ Detector tubes
_____ Eye Wash Units
_____ First Aid Kit
_____ Gloves (polyethylene)
_____ Gloves(PVC)
_____ Gloves (nitrile)
_____ Gloves (cloth)
_____ Boot covers
_____ Coveralls (tyvek)
_____ Coveralls (saranex)
_____ Auger Brushes

Respirator Worn By

Approximate Time in Respirator

Air Monitoring Data (Include Calibration Reading)

HNU:

OVA:

Explosimter:

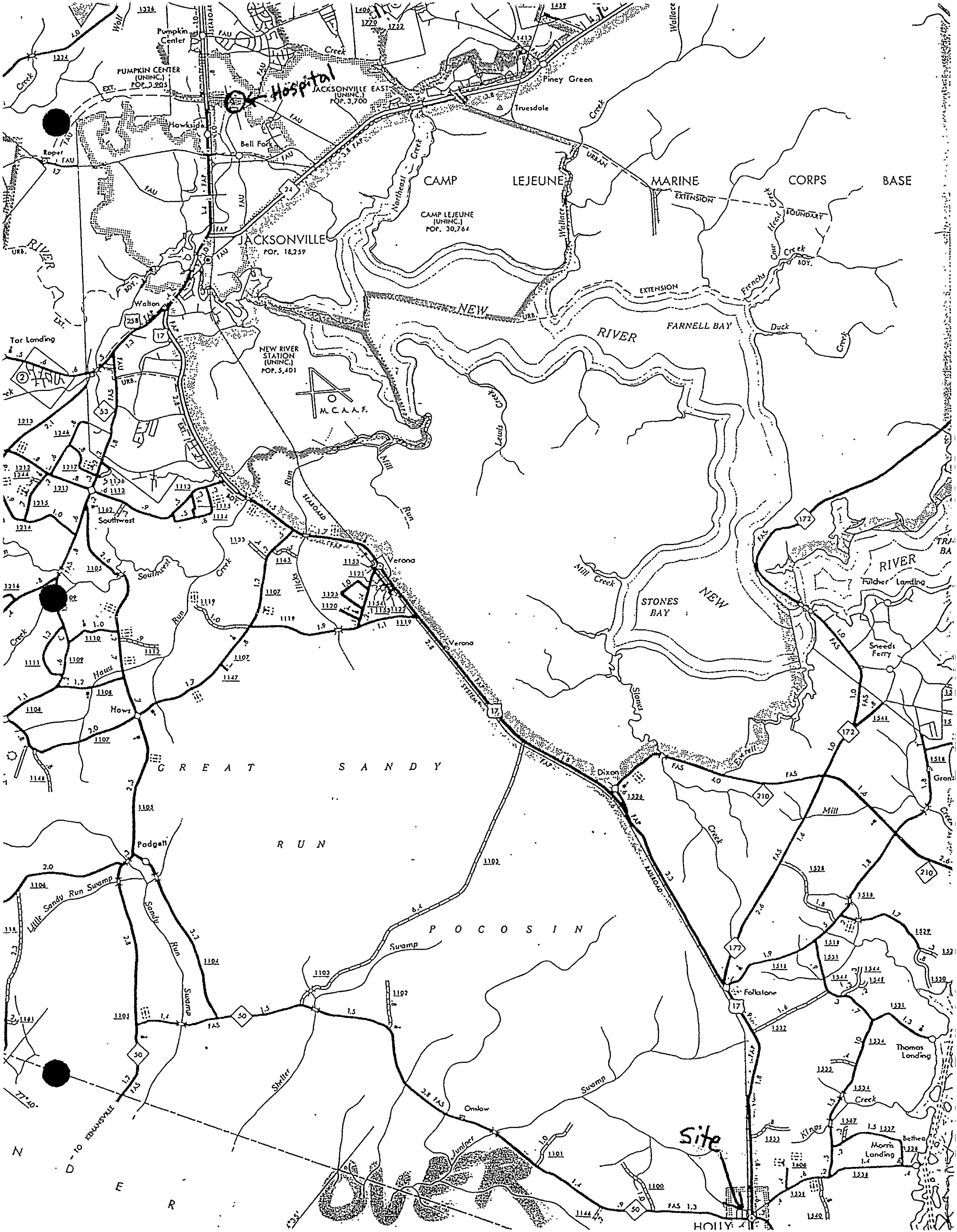
Radiation Meter:

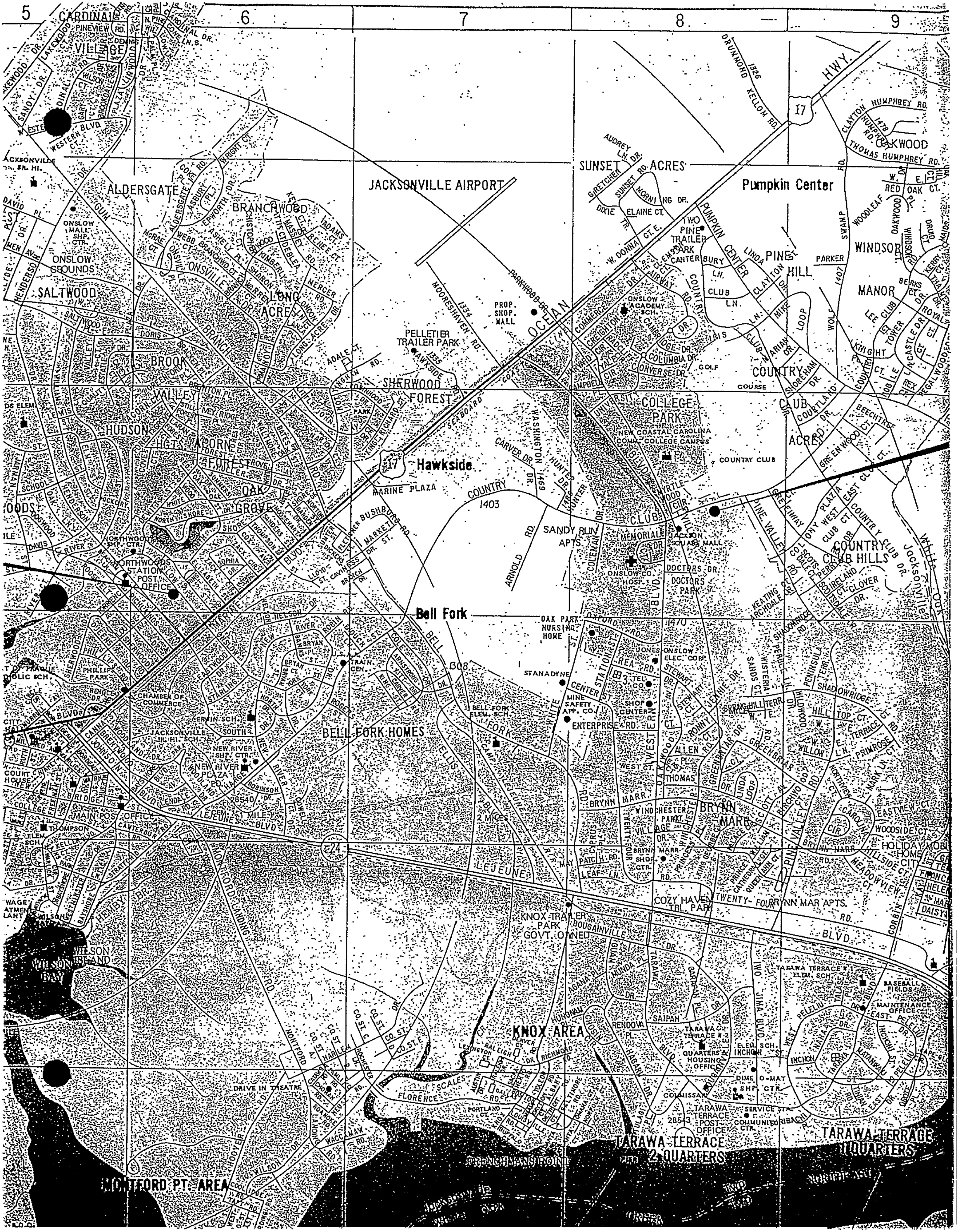
If the maximum personal protective equipment as outlined in the Hazard Evaluation Section was not used, please justify:

Visitors Present

Orginazation Represented

DL/ds/Revised 11-88


Hospital
Site
Pumpkin Center
PUMPKIN CENTER (UNINC.) POP. 3,905
JACKSONVILLE EAST (UNINC.) POP. 3,700
Piney Green
Truesdale
Hawkside
Bell Fork
Roper
CAMP LEJEUNE MARINE CORPS BASE
CAMP LEJEUNE (UNINC.) POP. 30,764
JACKSONVILLE POP. 18,259
NEW RIVER
Walton
Tar Landing
NEW RIVER STATION (UNINC.) POP. 5,401
M.C.A.A.F.
FARNELL BAY
Southwest
Verona
STONES BAY
Fulcher Landing
Sneeds Ferry
Haws
GREAT SANDY RUN POCOSIN
Dixon
Padgett
Folkstone
Thomas Landing
Morris Landing
Onslow
HOLLY
TO KENANSVILLE


5
6
7
8
9
CARDINAL VILLAGE
JACKSONVILLE AIRPORT
SUNSET ACRES
Pumpkin Center
ALDERSGATE
BRANCHWOOD
ONSLOW MALL SHP. CTR.
ONSLOW GROUNDS
SALTWOOD
LONG ACRES
PELLETIER TRAILER PARK
PROP. SHOP. MALL
OCEAN
HWY.
17
SHERWOOD FOREST
BROOK VALLEY
HUDSON HGTS.
ACORN FOREST
OAK GROVE
Hawkside
MARINE PLAZA
COUNTRY CLUB
1403
SANDY RUN APTS.
COLLEGE PARK
NEW COASTAL CAROLINA COMM. COLLEGE CAMPUS
COUNTRY CLUB ACRES
PINE HILL
WINDSOR MANOR
OAKWOOD
TWO PINE TRAILER PARK
ONSLOW ACADEMY SCH.
JACKSON SQUARE MALL
ONSLOW CO. HOSP.
DOCTORS PARK
COUNTRY CLUB HILLS
NORTHWOODS STATION POST OFFICE
Bell Fork
OAK PARK NURSING HOME
STANADYNE
MINE SAFETY APP. CO.
ENTERPRISE RD.
CHAMBER OF COMMERCE
ERWIN SCH.
JACKSONVILLE JR. HI. SCH.
NEW RIVER SHP. CTR.
NEW RIVER PLAZA
BELL FORK HOMES
BELL FORK ELEM. SCH.
COURT HOUSE
MAIN POST OFFICE
LEJEUNE BLVD.
24
BRYNN MARR
BRYNN MARR SHOP CTR.
WINCHESTER PARK VILLAGE
COZY HAVEN TRL. PARK
BRYNN MAR APTS.
HOLIDAY MOBILE HOME CITY
KNOX TRAILER PARK GOVT. OWNED
KNOX AREA
TARAWA TERRACE ELEM. SCH.
BASEBALL FIELDS
MAINTENANCE OFFICE
TARAWA TERRACE QUARTERS HOUSING OFFICE
DIME O-MAT SHP. CTR.
COMMISSARY
TARAWA TERRACE POST OFFICE
SERVICE STA.
COMMUNITY CTR.
TARAWA TERRACE 2 QUARTERS
TARAWA TERRACE QUARTERS
FRENCHMANS POINT
WILSON BAY
DRIVE IN THEATRE
MONTFORD PT. AREA
28540
28543

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: 2,4 dinitrophenol

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula $C_6H_4N_2O_5$	1
Natural Physical State at 25°C solid	1
Vapor Pressure no data mm Hg at 20°C	2
Melting Point 112-114 °F/°C Boiling Point not pert. °F/°C	2
Flash Point (open or closed cup) no data °C/°F	2
Solubility - H_2O insosuble	2
Other etyle acetate, acetone, chloroform, pyridine, carbon tetrachloride, toluene	

Physical Features: (odor, color, etc.) a solid, yellow crystal with a sweet, musty odor (2)

II. TOXICOLOGICAL DATA

Standards: 0.2mg/m^3 (2) TLV _____ PEL 5 mg/m^3 IDLH

Routes of Exposure: Inhalation, Ingestion, Skin contact, Eye contact

Acute/Chronic Symptoms: Liver damage, metabolic stimulant, dermatitis, dilation of puples

First Aid: Inhalation: fresh air, artifical respiration; Ingestion: get medical attention immediately; Skin contact: soap and water wash; Eye contact: flush with water immediately

Chemical Name: 2,4-dinitrophenol

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — 2

Toxic by-products vapors are toxic — 2

B. Flammability LEL _____ UEL _____ —

C. Reactivity Hazard reacts with oxidizing materials and combustibles — 2

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

1. The Merck Index, 10th Edition, 1983
2. Chemical Hazards Response Information System, 1985

US 50

Lloyd Street

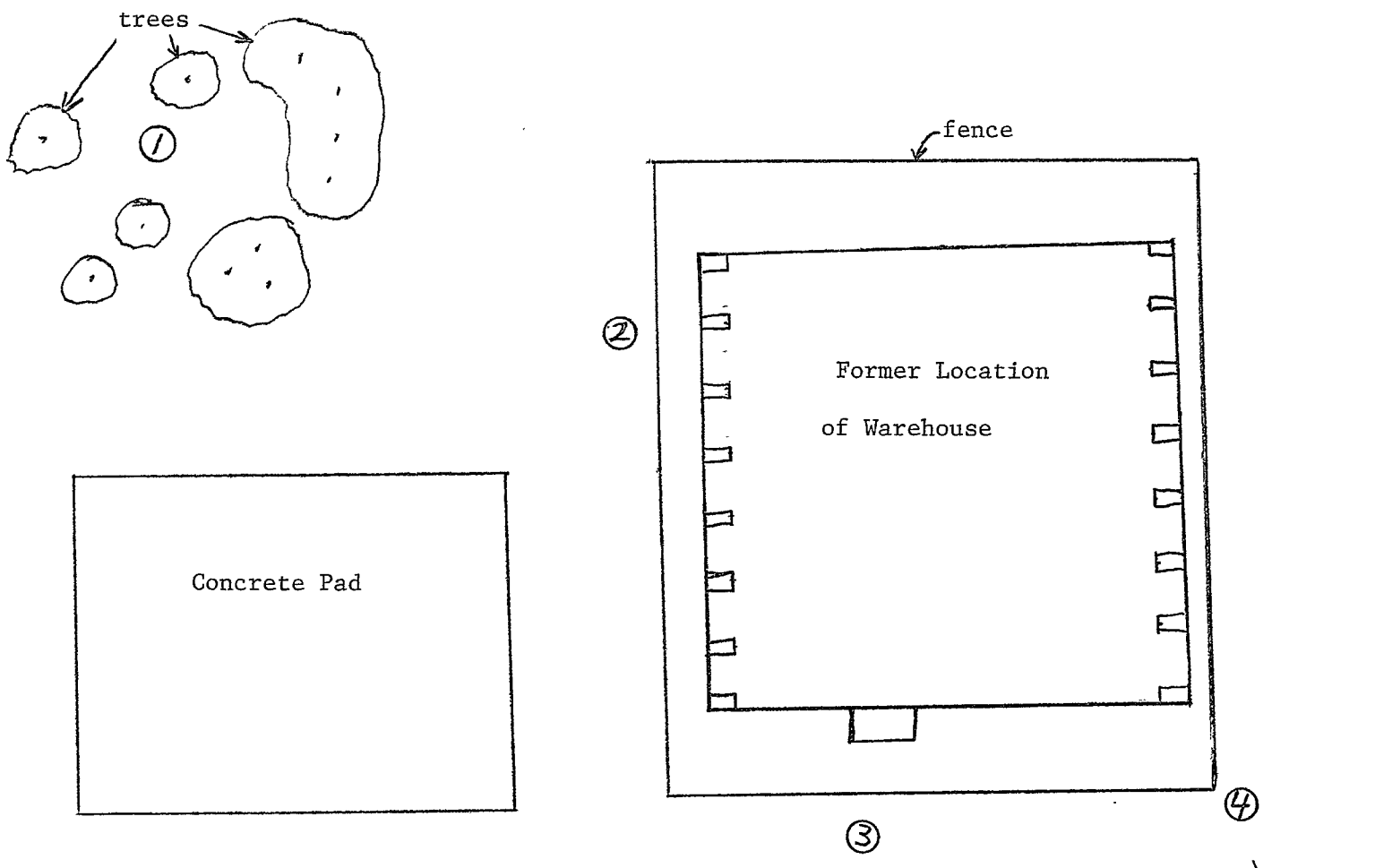


Figure 1 - Renroh Site Map

(Approximately to scale; 1 inch = 50 feet)

① - ④ Sampling Points