Listing of Concentrations (Stream Sediments) of Variables Which Equal or Exceed the 90th Percentile, and pH and Conductivity Below the 10th Percentile in the North Carolina Portion of the NURE Database

by

Jeffrey C. Reid and Robert H. Carpenter

NORTH CAROLINA GEOLOGICAL SURVEY

OPEN-FILE REPORT 93-1

State of North Carolina
James B. Hunt, Jr., Governor

Department of Environment, Health, and Natural Resources
Jonathan B. Howes, Secretary
Division of Land Resources
Charles H. Gardner,
Director and State Geologist

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INTRODUCTION

This report lists analyses for all variables which exceed the 90th percentile from the North Carolina portion of the U.S. Department of Energy's National Uranium Resource Evaluation (NURE) program; pH and conductivity values below the 10th percentile are also listed. Samples were collected and analyzed during the period 1975-1979. Before termination of the NURE program, sampling of the entire state (48,666 square miles of land area) was completed at a reconnaissance scale. Sample density averages one sample per 7.2 square miles of land area. Reid (1991) mapped the statewide distribution of stream sediment data, and the pH and conductivity values collected during sampling of the stream sediments. Reid (1993) also mapped the statewide distribution of groundwater analyses, and the limited stream water data contained in the NURE database. Reid and Carpenter (1993) list analyses for all variables which exceed the 90th percentile from the groundwater and stream water data of the North Carolina portion of the NURE program; pH and conductivity values below the 10th percentile are also listed. A series of open-file reports by Carpenter and Reid to be released in 1993 provide stream sediment, groundwater, and stream water data (where available) by 1:100,000 sheet that cover North Carolina.

The stream sediment database consists of 6,744 stream sediment sampling sites, along with latitude-longitude coordinates of the sampling sites. Samples were analyzed by neutron activation analyses for: uranium (U), thorium (Th), hafnium (Hf), cerium (Ce), iron (Fe), manganese (Mn), sodium (Na), scandium (Sc), titanium (Ti), vanadium (V), aluminum (Al), dysprosium (Dy), europium (Eu), lanthanum (La), samarium (Sm), ytterbium (Yb), and lutetium (Lu) in stream sediments. Supplemental analyses by other techniques were reported for extractable U, silver (Ag), arsenic (As), barium (Ba), beryllium (Be), calcium (Ca), cobalt (Co), chromium (Cr), copper (Cu), potassium (K), lithium (Li), magnesium (Mg), molybdenum (Mo), niobium (Nb), nickel (Ni), phosphorous (P), lead (Pb), selenium (Se), tin (Sn), strontium (Sr), tungsten (W), yttrium (Y), and zinc (Zn) for 4,619 stream sediment samples. Field measurements of pH and conductivity are included. A total of 336 samples analyzed had detectable gold (Au).

Maps showing the concentration of these elements are presented at a scale of 1:1,584,000. Reid (1991) contains a geologic overlay which closely approximates this scale (25 miles = 1 inch). This overlay was taken from the scale of the Geologic Highway Map of the Mid-Atlantic States (Bennison, 1989). Geologic maps of the state (North Carolina Geological Survey, 1985, 1991) provide additional information.

The maps define regional geochemical patterns which broadly delineate areas within the state where element concentrations are, on average, higher or lower than other areas. Such information allows, for example, assessment of individual counties for baseline geochemical evaluations, environmental assessments, agricultural and epidemiological studies. The maps have limited applicability for detailed, or site-specific studies. However, concentrations of variables which equal or exceed the 90th percentile (this report), and pH and conductivity values below the 10th percentile (this report) can be used for more detailed compilation. Table 1 lists county codes.

The NURE data are applicable to mineral exploration, agriculture, waste disposal siting issues, health, and environmental studies. Applications in state government include resource surveys to assist mineral exploration by identifying geochemical anomalies and areas of potential mineralization. Agriculture seeks to identify areas with favorable (or unfavorable) conditions for plant growth, disease, and crop productivity. Trace elements such as cobalt, copper, chromium, iron, manganese, zinc, and molybdenum must be present within narrow ranges in soils for optimum plant growth and productivity. Trace elements as a contributing factor to disease are of concern to health professionals. Industry can use pH and conductivity data for water samples to site facilities which require specific water quality.

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Table 1. North Carolina county codes, NURE database.

County	Code
Alamance	AL
Alexander	AE
Alleghany	AG
Anson	AN
Ashe	AS
Avery	AV
Beaufort	BE
Bertie	BR
Bladen	BL
Brunswick	BU
Buncombe	BN
Burke	BK
Cabarrus	CA
Caldwell	CL
Camden	CM
Carteret	CR
Caswell	CS
Catawba	CT
Chatham	CH
Cherokee	CE
Chowan	CO
Clay	CY
Cleveland	CV
Columbus	CB
Craven	CN
Cumberland	CU
Currituck	CI
Dare	DA
Davidson	DV
Davie	DE
Duplin	DU
Durham	DR
Edgecombe	ED
Forsyth	FO
Franklin	FR
Gaston	GA
Gates	GT
Graham	GR
Granville	GN
Greene	GE
Guilford	GU
Halifax	HA
Harnett	HR
Haywood	HY
Henderson	HE
Hertford	HT
Hoke	HO
Hyde	HD
Iredell	IR
Jackson	JA

Table 1. North Carolina county codes (continued), NURE database.

Johnston	JO
Jones	JN
Lee	LE
Lenoir	LN
Lincoln	LI
McDowell	MC
Macon	MA
Madison	MD
Martin	MR
Mecklenburg	ME
Mitchell	MT
Montgomery	MG
Moore	MO
Nash	NA
New Hanover	NH
Northampton	NO
Onslow	ON
Orange	OR
Pamlico	PA
Pasquotank	PS
Pender	PE
Perquimans	PR
Person	PN
Pitt	PI
Polk	PO
Randolph	RA
Richmond	RI
Roberson	RO
Rockingham	RC (GW)
	RO (surface)
Rowan	RW
Rutherford	RU
Sampson	SA
Scotland	SC
Stanly	ST
Stokes	SO
Surry	SU
Swain	SW
Transylvania	TR
Tyrrell	TY
Union	UN
Vance	VA
Wake	WA
Warren	WR
Washington	WS
Watauga	WT
Wayne	WY
Wilkes	WL
Wilson	WI
Yadkin	YD
Yancey	YN

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