

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

**Analytical results for ten water-extractable ions from
B-horizon soils on St. Thomas and St. Croix, U.S. Virgin Islands
and K-Ar ages for seven rocks from St. John and St. Thomas,
U.S. Virgin Islands**

By

J.B. McHugh, R.E. Tucker, and H.V. Alminas

Open-File Report 89- 563

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

1989

CONTENTS

	Page
Introduction.....	1
Study area.....	1
General geology.....	1
Sample collection.....	5
Analytical procedures.....	5
Results.....	9
References Cited.....	9

ILLUSTRATIONS

Figure 1. Index map, U.S. Virgin Islands study area.....	2
Figure 2. Generalized geologic map of St. Croix, U.S. Virgin Islands.....	3
Figure 3. Generalized geologic map of St. Thomas and St. John, U.S. Virgin Islands, with site localities of samples collected for dating using the K-Ar whole rock method.....	6
Figure 4. Sample site locality map for St. Croix, U.S. Virgin Islands....	7
Figure 5. Sample site locality map for St. Thomas, U.S. Virgin Islands...	8

TABLES

Table 1. Analytical methods used for determining the concentration of water-extractable ions.....	11
Table 2. Data results for water-extractable ions from B-horizon soils, St. Croix, U.S. Virgin Islands.....	12
Table 3. Data results for water-extractable ions from B-horizon soils, St. Thomas, U.S. Virgin Islands.....	18

Introduction

The U.S. Geological Survey began multidisciplinary studies of the U.S. Virgin Islands in 1983. These studies are being conducted to assist the Territorial Government of the Virgin Islands by providing necessary information for future planning and resource appraisal. The initial phase of this geochemical study was designed to examine the regional geochemical characteristics of the islands and to identify possible minerals potential (Tucker and others, 1985; and Alminas and Tucker, 1987).

Geochemical sampling was conducted on the three main islands of St. Croix, St. John, and St. Thomas, and numerous smaller islands in the region from 1983 to 1988. Over 1,500 samples of rocks, soils, and stream sediments were collected and analyzed for 31 elements by emission spectrography and for gold and tellurium by atomic absorption spectroscopy (Hopkins and others, 1986; McHugh and others, 1989).

This open-file reports the analytical results of the water-extractable ions Na, Cl, K, Mg, Ca, Ag, Cu, Zn, F, and SO₄ from B-horizon soils on St. Thomas and St. Croix.

Study Area

The U.S. Virgin Islands are located in the Greater Antilles Island arc some 40 miles east of Puerto Rico (fig. 1). The major islands include St. Croix, St. John, and St. Thomas. There are about 40 smaller islands in the study area concentrated near St. Thomas and St. John. The British Virgin Islands are located a few miles northeast of St. John Island.

St. Croix is the largest of the U.S. Virgin Islands, with an area of 84 miles and is located 35 miles south of St. Thomas. St. John Island covers 19 square miles and St. Thomas Island contains 30 square miles. The topography of the islands is mountainous. Broad flatlands occur in the central portion of St. Croix. The highest points in the study area are Crown Mountain on St. Thomas (1,556 ft), Bordeaux Mountain on St. John (1,277 ft), and Mt. Eagle on St. Croix (1,165 ft). The coastline of St. Croix is regular. The coastlines of St. John and St. Thomas are irregular with numerous bays. Small fringing coral reefs are common in shallow water.

The climate in the Virgin Islands is maritime tropical. The average annual rainfall at higher elevations is 50-60 inches per year and at lower elevations is 20-30 inches per year. There is no well-defined wet or dry season. The temperature is generally constant between 80 and 85°F.

The vegetation is generally not native to the islands and consists of thorny brush and Hurricane grass in the formerly cleared areas. The uncleared portions of the more mountainous areas are covered by dense tropical forest with a few large trees and a dense undergrowth of brushes and vines. There are only a few free-flowing streams and these are frequently intermittent.

General Geology

The natural history and geology of the Virgin Islands have been studied by many naturalists and scientists over the years (Shomburgk, 1837; Cleve, 1881; Meyerhoff, 1926; Donnelly, 1959, 1966; Helsley, 1960; Whetten, 1966; Alminas and Tucker, 1987; Tucker, 1987). Most of these studies have focused on the stratigraphic sequences and rock types.

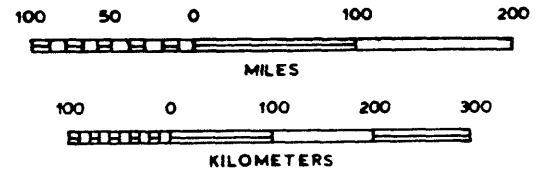
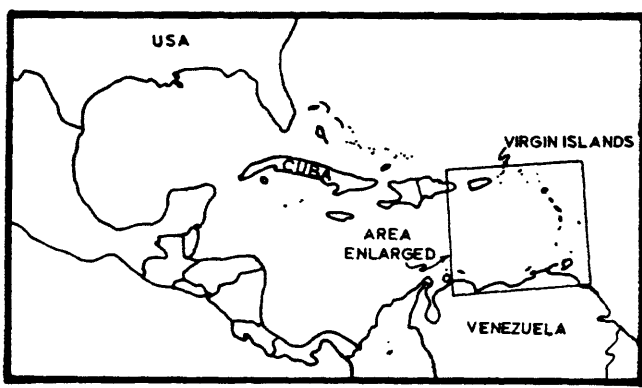
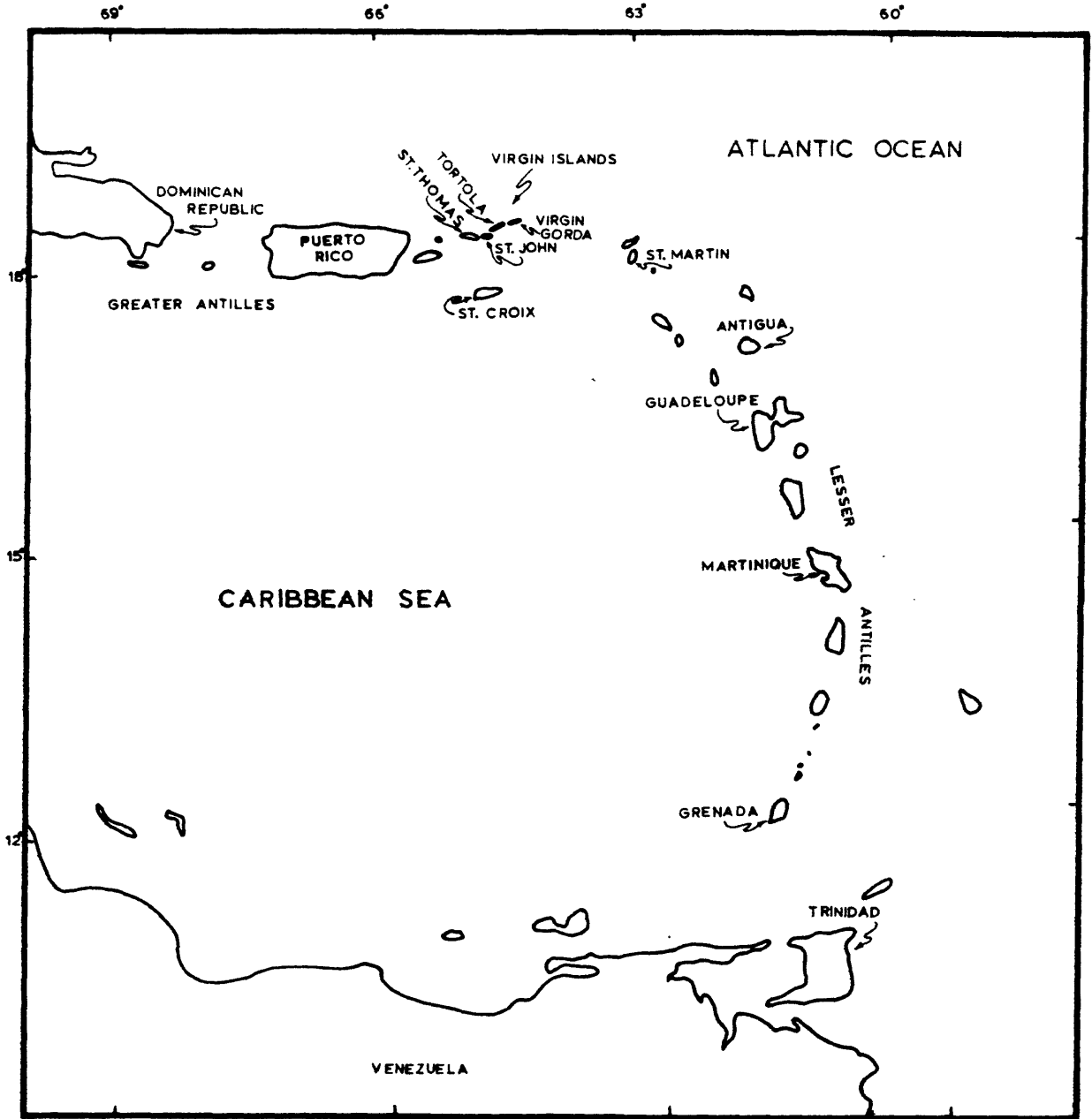


Figure 1.--Index map of the Virgin Islands and vicinity.

The oldest exposed rocks on St. Croix are Upper Cretaceous in age. The rocks, composed of volcanic sandstones, mudstones, limestone beds, and siliceous siltstones, are collectively called the Mt. Eagle Group (Cederstrom, 1941, 1950; Whetten, 1966). The oldest rocks are found in the Allandale (2,000 ft in thickness) and Caledonia (approximately 18,000 ft in thickness) Formations which are interspersed vertically and laterally across the island. Overlying these Formations is the Cane Valley Formation. These rocks are a sequence of mudstones and tuffaceous sandstones up to 1,700 ft in thickness.

Overlying the Cane Valley Formation is the Judith Fancy Formation. This series of rock is approximately 15,000 ft of interlayered tuffaceous sandstones, thin limestone beds, mudstones, and volcanic pebble conglomerate. The rocks of the Judith Fancy Formation typically show a marked difference across the island.

The island is bisected by a wide, centrally located graben. The graben infilling is some 7,000 ft of mudstone. The Jealousy Formation includes the upper 1,400 ft of exposed montmorillonitic mudstone. These sediments are believed to be upper Oligocene in age (Whetten, 1966).

Overlying the Jealousy Formation is the Kingshill Marl. This unit is approximately 600 ft of fossil coral reefs exposed on the coastal plain.

Igneous rocks include the Fountain gabbro, located in the northwestern highlands and the Southgate diorite located in the eastern portion of the island (Whetten, 1966). Numerous dikes, ranging in composition from very mafic to rhyolitic, are found throughout the island but are dominant near the east end. Rhyolitic plugs and intrusive bodies were observed in several localities throughout the island during this geochemical study. A generalized geologic map of St. Croix is given on figure 2.

St. Croix has undergone rather extensive alteration and mineralization. The mineralization consists of base and precious metals, primarily associated with the graben walls, possible intrusives in the northwestern highlands, and areas of folding on the eastern portion of the island (Alminas and Tucker, 1987; McHugh and others, 1989). Sand-sized grains of naturally occurring native tin and lead are found throughout the northwestern highlands and within the graben. Gold concentrations above 20 ppb occur in several areas near the graben walls, in the northwestern highlands, and in quartz veins cutting the Southgate diorite (Alminas and Tucker, 1987; McHugh and others, 1989).

St. Thomas and St. John are composed predominantly of volcanic rocks. The southern portions of both islands are composed of felsic flows, mafic dikes and thin beds of radiolarites. Collectively, these three units make up the Water Island Formation (Donnelly, 1966). Unconformably overlying the Water Island Formation is the Louisenhoj Formation. The Louisenhoj Formation is a thick sequence of andesitic ejecta and coarse tuff beds.

The Outer Brass Limestone overlies the Louisenhoj Formation. This unit is predominantly siliceous limestone with about 10 percent interbedded crystal tuffs.

The Outer Brass Limestone is overlain by the Tutu Formation. The Tutu Formation is composed of fine- to coarse-grained volcanic wackes made up of weathered Louisenhoj rocks. Thin limestone beds are interlayered with the wackes. The Tutu Formation on Grass Cay, Mingo Cay, Lovango Cay, and Mary Point is a garnetiferous skarn. Numerous iron veins cut the skarn.

The Coki Point megabreccia lithofacies of the Tutu Formation are composed of large fossiliferous limestone blocks. The fossil evidence suggests an Albian age (113-93.5 MA). The Congo Cay Limestone Member is coarsely crystalline limestone that is exposed only on Congo Cay in the U.S. Virgin Islands.

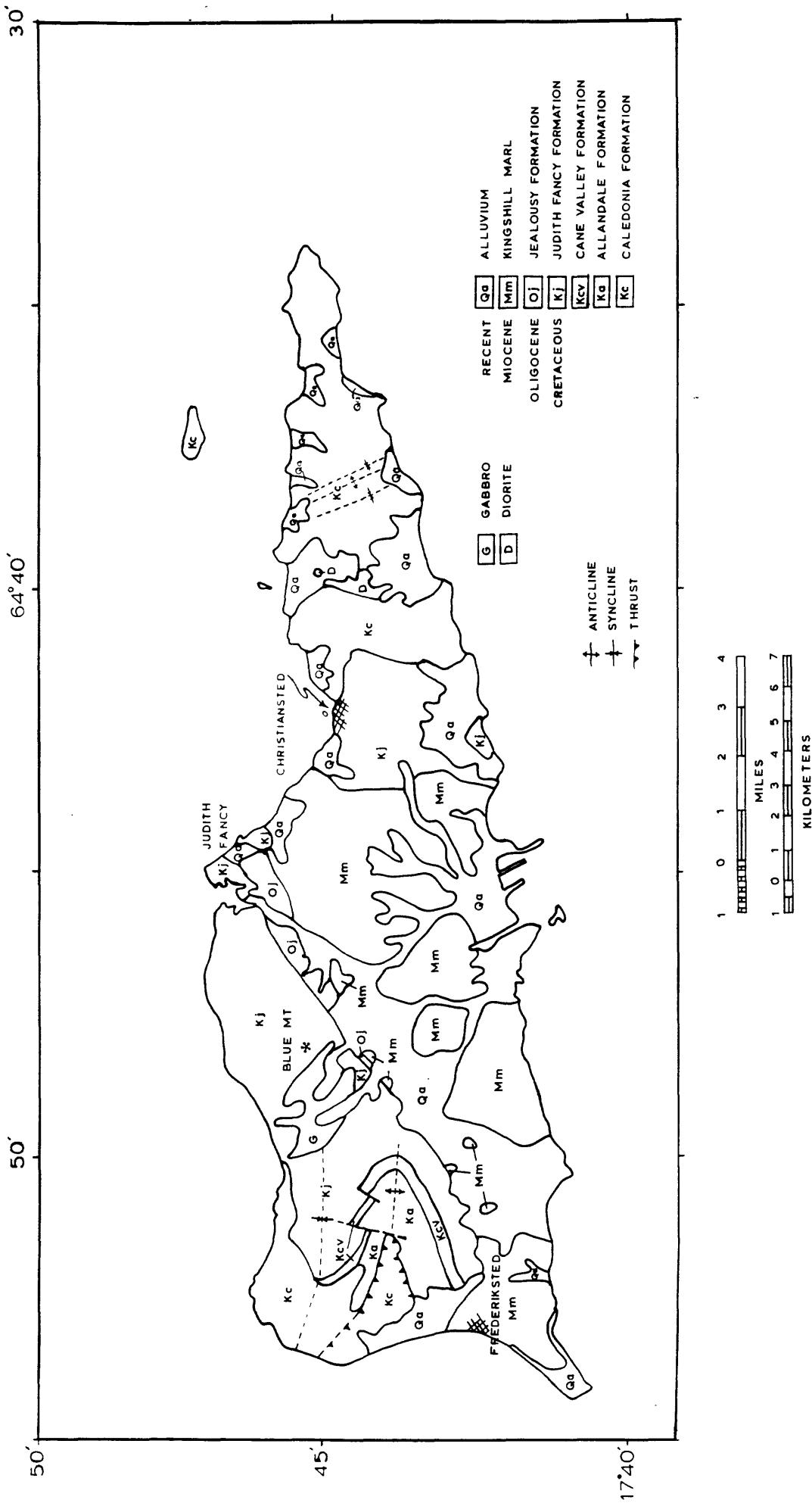


Figure 2 Generalized geologic map of St. Croix, U.S. virgin Islands.

The Hans Lollik Formation crops out on the two Hans Lollik Islands. This unit is very similar mineralogically and texturally to the Louisenhoj Formation. It should be noted that the geology of the British Virgin Islands as described by Helsley (1960) is not a simple continuum of the layered sequence in the U.S. Virgin Islands set forward by Donnelly (1966). A generalized geologic map for St. Thomas and St. John is given on figure 3.

In conjunction with the geochemical study, five rocks from the Water Island Formation and two rocks from the Louisenhoj Formation were dated by K-Ar whole rock technique. The felsic rocks range in age from 30.9 to 65.8 MA. The andesitic rocks were dated at 38.6 and 42.1 MA (fig. 3) (Tucker, 1987). These dates indicate the Water Island and Louisenhoj Formations are much younger than previously believed. Accretionary processes are undoubtedly responsible for the addition of the older sedimentary rocks onto an existing felsic platform. Felsic activity has continued over an extended period.

Interpretations of the data from stream-sediment concentrates, rocks, and soils indicate extensive mineralization occurs throughout the study area (Tucker and others, 1985; Alminas and Tucker, 1987; Tucker, 1987). The mineralization consists of precious and base metals associated with sulfide-rich igneous bodies and zones of hydrothermal alteration. Throughout the study area, the mineralization transects the major rock units.

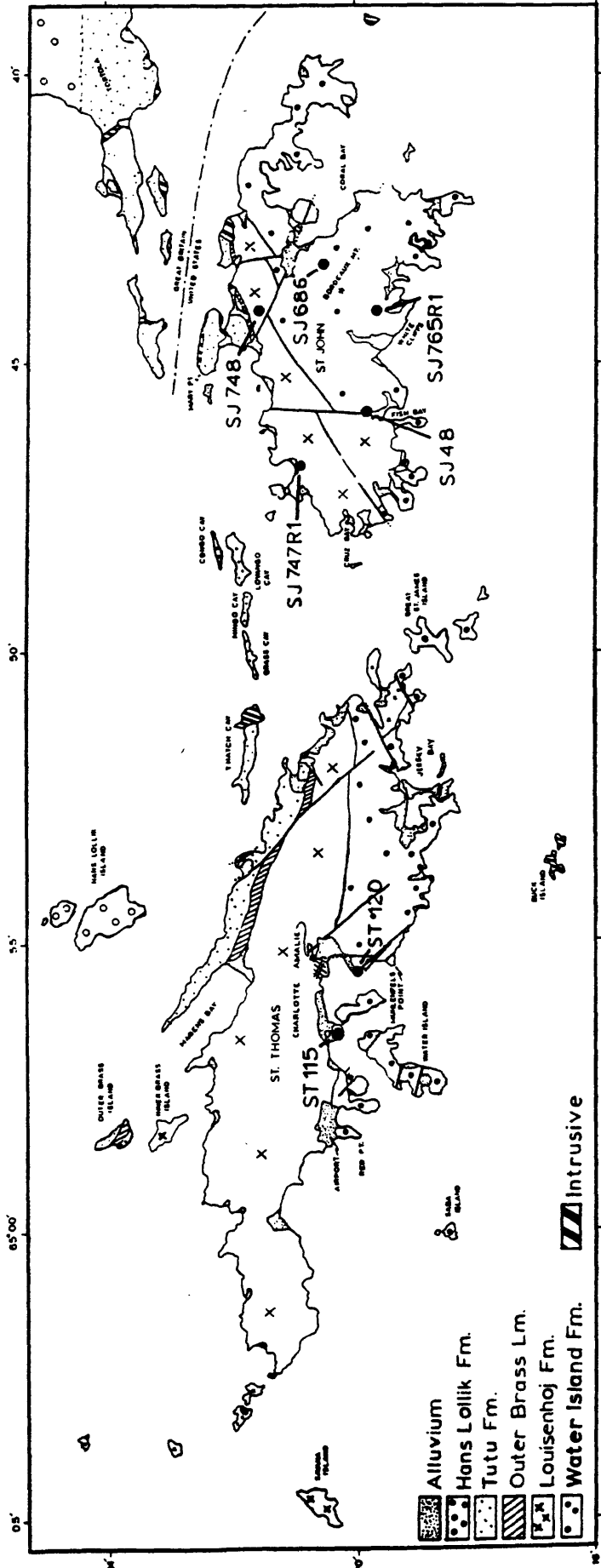
Sample Collection

Geochemical sampling was conducted from 1983 to 1988 on the three main islands of St. Croix, St. John, and St. Thomas, and numerous smaller islands in the region. Over 1,500 rock, soil, and stream-sediment samples were collected and analyzed for 31 elements by 6-step D.C.-arc emission spectrography (Hopkins and others, 1986; and Mchugh and others, 1989). Gold analysis by atomic absorption spectroscopy is presented in Mchugh and others (1989). Analytical results for *B. cereus* population densities from A-horizon soils and ten water extractable ions from A- and B-horizon soils on St. John are presented in Tucker and others (1989).

Sample collection was conducted by H.V. Alminas and R.E. Tucker. B-horizon soil samples were collected throughout the study area in conjunction with stream-sediment and rock-chip sampling. The B horizon or a zone of rather distinct reddening generally occurred at a depth of between 12 to 18 inches. In cases where no distinct B-horizon soil was present, such as in the graben infilling on St. Croix a sample was collected at a depth of approximately 18 inches. The leaf litter was cleared from an area approximately 12 inches in diameter. The top 4 inches of soil was loosened, hand mixed, placed in a cloth bag, and allowed to air dry. Approximately 1.5 pounds of soil were collected at all sample localities. The sample locality maps for St. Croix and St. Thomas are given on figures 4 and 5, respectively.

Analytical Procedures

A water-leach extraction of the soil samples was conducted to examine the ionic concentrations of some metals and anions that could be readily available within the secondary environment. The technique involved placing 1 g of soil in a test tube with 10 ml of deionized water. The soil was thoroughly mixed and the tube was placed on its side. The samples were hand mixed every other day. Time phased dissolution experiments indicated equilibrium was reached in 5 to 7 days (Tucker, 1987). At the end of 7 days, the samples were centrifuged and the supernatant liquid was placed in a clean test tube.



ST115	40.7 ± 1.1 Ma	SJ48	50.2 ± 5.7 Ma	SJ747R1	42.1 ± 0.6
ST120	65.8 ± 2.9 Ma	SJ685	37.7 ± 1.1 Ma	SJ748	38.6 ± 0.8 Ma
SJ765R1	30.9 ± 0.3 Ma				

Figure 3 Generalized geologic map of St. Thomas and St. John, U.S. Virgin Islands, with site localities of samples collected for K-Ar whole rock dating.

64°55'
17°50'

64°3'

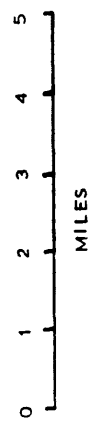
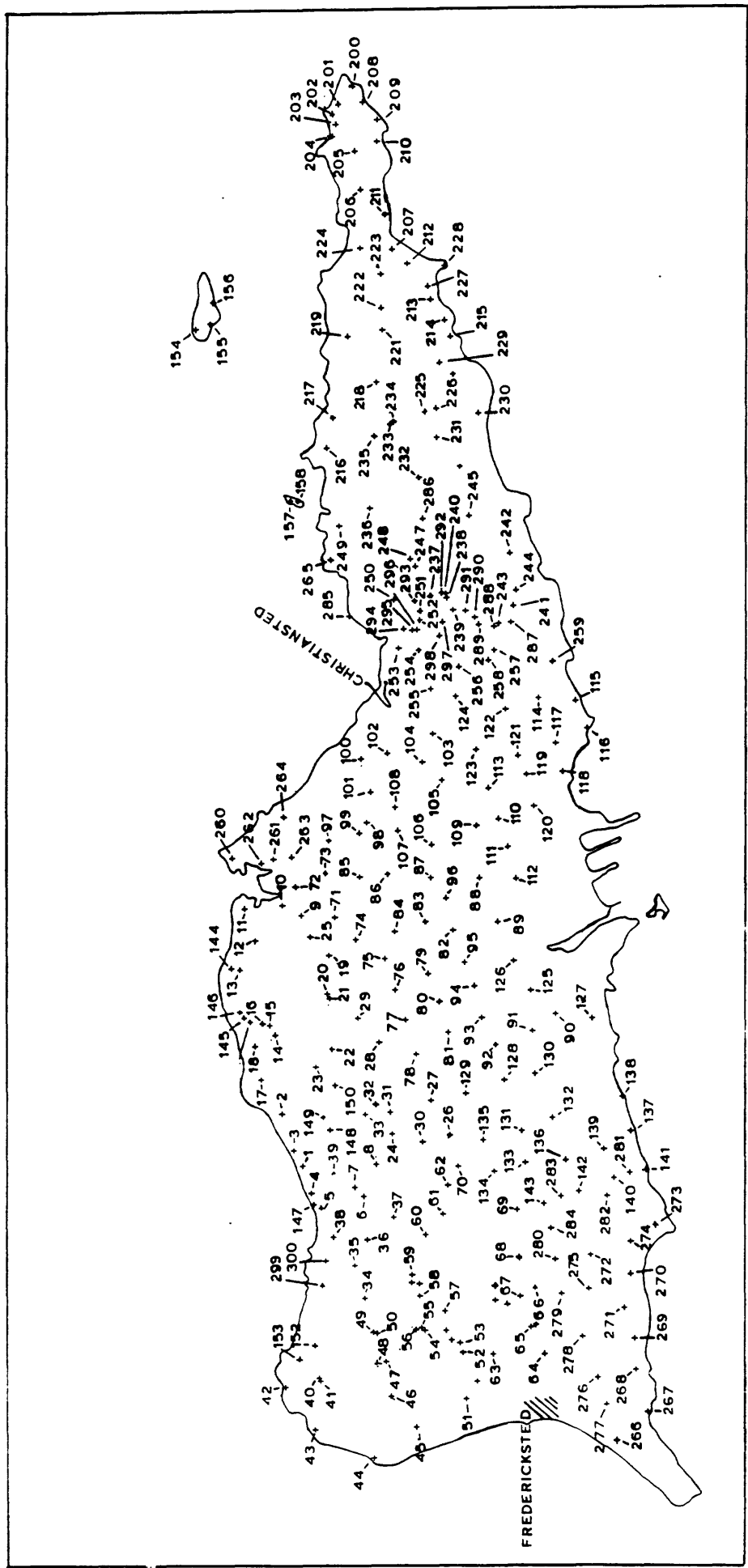


Figure 4 Sample site locality map for St. Croix, U.S. Virgin Islands.

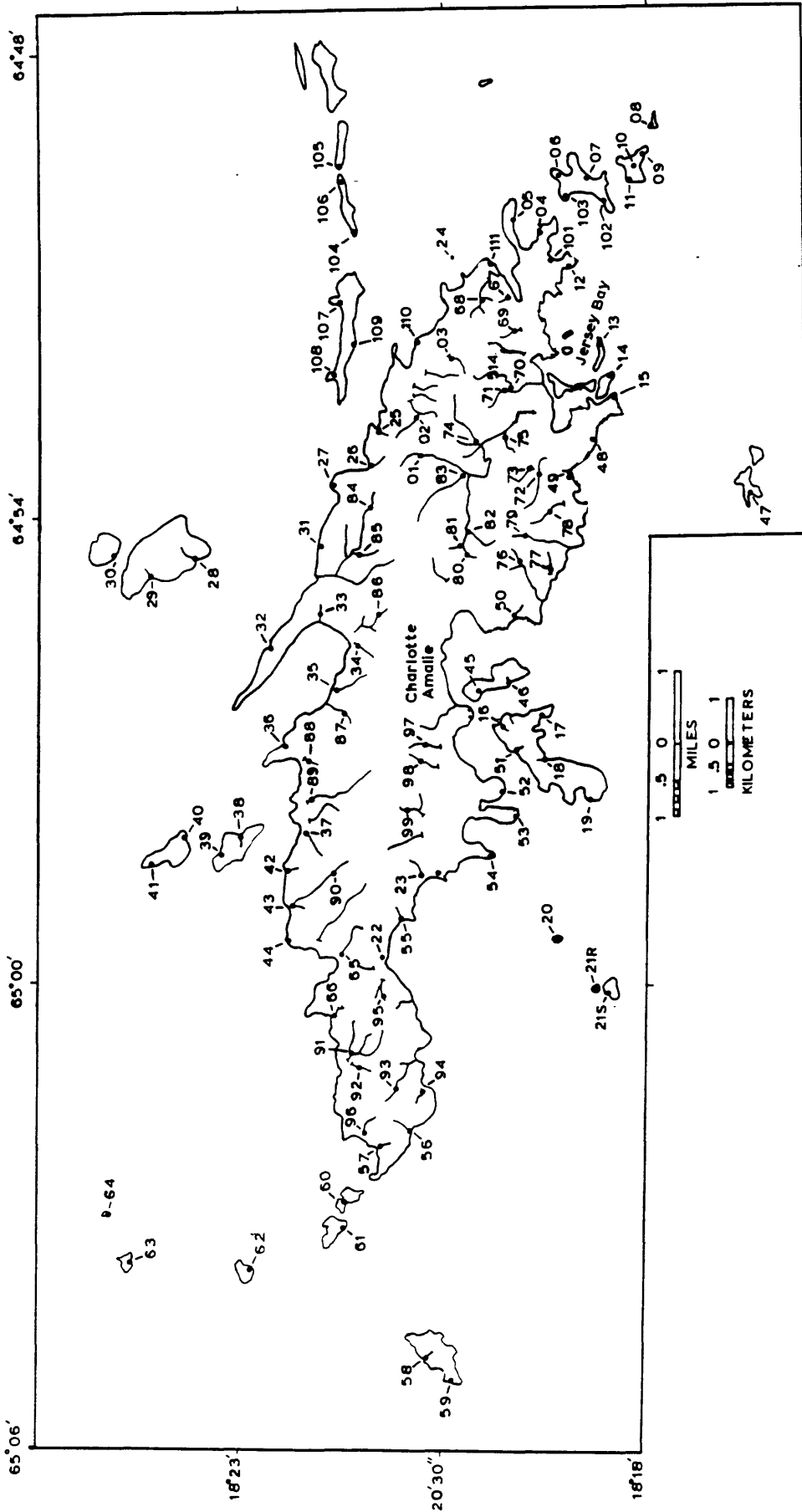


Figure 5 Sample site locality map for St. Thomas, U.S. Virgin Islands.

The concentration of dissolved ionic constituents was determined by atomic absorption and ion chromatography (table 1). The concentration of Mg, Na, Ca, K, Cl, SO₄, F, Zn, Cu, and Ag was determined in each sample.

Results

Water extractable ion data from St. Croix and St. Thomas are given in tables 2 and 3, respectively. In each table, column 1 contains the USGS-assigned sample number. The first digit represents the year the sample was collected; 3 for 83, 4 for 84, etc. The alpha characters represent St. Croix (SC) or St. Thomas (ST). The next 3 numerals represent the site designator. The last alpha character, S, designates the sample as a soil.

References

- Alminas, H.V., and Tucker, R.E., 1987, Lead, tin, and precious-metal mineralization in the U.S. Virgin Islands: Society of Mining Engineers annual meeting preprint number 87-108.
- Cederstrom, D.J., 1941, Notes on the physiography of St. Croix, Virgin Islands: *American Journal of Science*, v. 239, no. 8, p. 553-578.
- _____, 1950, Geology and ground-water resources of St. Croix, Virgin Islands: U.S. Geological Survey Water Supply Paper 1067, 117 p.
- Cleve, P.T., 1881, Outline of the geology of the north-eastern West India Islands: *Annals of the New York Academy of Sciences*, v. 2, p. 185-192.
- Donnelly, T.W., 1959, Geology of St. Thomas and St. John, Virgin Islands: Ph.D. thesis, Princeton University, 191 p.
- _____, 1966, Geology of St. Thomas and St. John, U.S. Virgin Islands: *Geological Society of America Memoir* 98, p. 85-176.
- Fishman, J.J., and Pyen, G., 1979, Determination of selected anions in water by ion chromatography: U.S. Geological Survey Water Resources Investigations 79-101, 30 p.
- Helsley, C.E., 1960, Geology of the British Virgin Islands, Princeton University: Ph.D. thesis, 219 p.
- Hopkins, R.T., Tucker, R.E., Roemer, T.A., Sharkey, J.D., and Alminas, H.V., 1986, Analytical results from a geochemical survey of the U.S. Virgin Islands: U.S. Geological Survey Open-File Report 86-86, 229 p.
- McHugh, J.B., Tucker, R.E., Hopkins, R.T., Roemer, T.A., and Alminas, H.V., 1989, Gold, silver, tellurium, and spectrographic analysis for rock and soil samples from the U.S. Virgin Islands: U.S. Geological Survey Open-File Report 89-355, 64 p.
- Meyerhoff, H.A., 1926, Scientific survey of Puerto Rico and the Virgin Islands: *New York Academy of Sciences*, v. 14, parts 1-2, p. 71-219.
- Perkin-Elmer Corporation, 1976, Analytical methods for atomic-absorption spectrophotometry: Norwalk, Connecticut, Perkin-Elmer Corporation, 586 p.
- _____, 1977, Analytical methods for atomic-absorption spectrophotometry, using the HGA graphite furnace: Norwalk, Connecticut, Perkin-Elmer Corporation, 208 p.
- Shomburgk, R.H., 1837, Die Jungfrau-Inseln, in geologischer und klimatischer hinsicht: *Berghaus Almanach fur Erdkunde*, p. 367-455.
- Tucker, R.E., 1987, A geochemical study of St. John, U.S. Virgin Islands: Ph.D. thesis, Colorado School of Mines, T-3438, 405 p.
- Tucker, R.E., Alminas, H.V., and Hopkins, R.T., 1985, Geochemical evidence for metallization on St. Thomas and St. John, U.S. Virgin Islands: U.S. Geological Survey Open-File Report 85-297, 46 p.

Tucker, R.E., McHugh, J.B., and Alminas, H.V., 1989, A study of Bacillus cereus distributions and ten water extractable ions from soils on St. John, U.S. Virgin Islands: U.S. Geological Survey Open-File Report 89- ; p.

Whetten, J.T., 1966, Geology of St. Croix, U.S. Virgin Islands: Geological Society of America Memoir 98, p. 177-239.

**Table 1.--Analytical methods used for determining the
concentration of water-extractable ions**

Constituents	Method	Reference
SO ₄ , Cl, F	Ion chromatography	Fishman and Pyen (1979)
Ca, Mg, Na, K, Zn	flame atomic-absorption spectrophotometry	Perkin-Elmer Corp. (1976)
Ag, Cu	Flameless atomic- absorption spectrophotometry	Perkin-Elmer Corp. (1977)

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC001S	17 46 1	64 49 21	405	110	28	114	<.2	<1.0	<1.0	16	<20	<5
4SC002S	17 46 17	64 48 37	730	130	15	230	<.2	<1.0	<1.0	10	<20	<5
4SC003S	17 46 8	64 49 7	670	92	44	78	<.2	<1.0	<1.0	12	<20	<5
4SC004S	17 45 54	64 49 44	90	42	120	10	<.2	<1.0	<1.0	12	<20	<5
4SC005S	17 45 46	64 50 1	300	106	32	162	<.2	<1.0	1.0	11	<20	<5
4SC006S	17 45 11	64 49 47	24	44	80	14	.4	<1.0	<1.0	8	<20	<5
4SC007S	17 45 18	64 49 39	58	54	43	22	.4	<1.0	<1.0	6	<20	<5
4SC008S	17 45 1	64 49 19	325	95	49	18	<.2	<1.0	<1.0	9	<20	<5
4SC009S	17 46 2	64 45 49	770	190	75	95	<.2	<1.0	<1.0	26	<20	<5
4SC010S	17 46 17	64 45 40	500	138	36	70	<.2	<1.0	<1.0	15	<20	<5
4SC011S	17 46 47	64 45 43	190	140	126	62	.4	<1.0	1.0	19	<20	<5
4SC012S	17 46 39	64 46 10	200	115	83	116	.3	<1.0	1.7	38	30	<5
4SC013S	17 46 51	64 46 35	195	150	100	56	<.2	<1.0	<1.0	21	<20	<5
4SC014S	17 46 23	64 47 30	270	115	53	29	.2	<1.0	<1.0	14	<20	<5
4SC015S	17 46 27	64 47 22	70	63	76	24	.5	<1.0	1.0	9	<20	<5
4SC016S	17 46 33	64 47 20	215	94	47	128	.3	<1.0	<1.0	11	<20	<5
4SC017S	17 46 34	64 48 7	360	168	52	66	.2	<1.0	<1.0	18	<20	<5
4SC018S	17 46 39	64 47 39	230	145	57	68	.2	<1.0	<1.0	12	<20	<5
4SC019S	17 45 39	64 46 22	740	40	23	48	<.2	<1.0	<1.0	11	<20	<5
4SC020S	17 45 40	64 46 55	710	92	28	86	<.2	<1.0	<1.0	30	<20	<5
4SC021S	17 45 38	64 46 59	82	130	680	42	1.5	1.2	1.5	28	<20	6
4SC022S	17 45 37	64 47 42	690	148	37	56	<.2	<1.0	<1.0	10	<20	<5
4SC023S	17 45 50	64 47 57	120	82	96	12	.3	<1.0	1.1	28	<20	<5
4SC024S	17 44 48	64 48 54	270	85	53	22	.2	<1.0	<1.0	13	<20	<5
4SC025S	17 45 54	64 46 7	810	120	31	145	<.2	<1.0	1.6	46	<20	<5
4SC026S	17 44 1	64 48 55	640	235	62	66	<.2	<1.0	<1.0	14	<20	<5
4SC027S	17 44 18	64 48 24	830	100	38	56	<.2	<1.0	<1.0	14	<20	<5
4SC028S	17 44 59	64 47 37	870	140	138	122	<.2	<1.0	<1.0	28	<20	<5
4SC029S	17 45 16	64 47 16	720	130	74	140	.2	<1.0	<1.0	20	<20	<5
4SC030S	17 44 23	64 49 0	135	56	126	5	<.2	<1.0	<1.0	25	<20	7
4SC031S	17 44 50	64 48 35	285	108	94	24	<.2	<1.0	<1.0	20	<20	<5
4SC032S	17 45 2	64 48 26	410	198	38	68	.2	<1.0	<1.0	26	<20	<5
4SC033S	17 45 10	64 48 37	370	125	66	94	<.2	<1.0	<1.0	41	<20	<5
4SC034S	17 45 10	64 51 13	435	70	49	33	<.2	<1.0	<1.0	17	<20	<5
4SC035S	17 45 18	64 50 46	175	102	58	16	<.2	<1.0	<1.0	8	<20	<5
4SC036S	17 45 8	64 50 24	930	128	48	28	<.2	<1.0	<1.0	16	47	<5
4SC037S	17 44 47	64 50 5	86	60	178	11	.2	<1.0	<1.0	17	<20	<5
4SC038S	17 45 36	64 50 21	115	45	106	10	<.2	<1.0	<1.0	15	<20	<5
4SC039S	17 45 37	64 49 25	50	34	63	6	.2	<1.0	<1.0	6	<20	<5
4SC040S	17 45 47	64 52 20	760	175	46	112	<.2	<1.0	1.5	24	<20	<5
4SC041S	17 45 46	64 52 23	510	145	75	86	<.2	<1.0	1.0	22	<20	<5
4SC042S	17 46 14	64 52 28	235	80	23	84	.3	<1.0	1.0	18	<20	<5
4SC043S	17 45 50	64 53 4	610	120	47	65	<.2	<1.0	<1.0	44	<20	<5
4SC044S	17 45 2	64 53 28	260	58	22	56	.3	<1.0	1.0	10	<20	<5
4SC045S	17 44 28	64 53 2	540	64	21	70	<.2	<1.0	1.4	12	<20	<5

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC046S	17 44 49	64 52 36	240	76	66	28	.2	<1.0	1.2	10	<20	<5
4SC047S	17 44 53	64 52 6	240	62	50	42	.3	<1.0	<1.0	20	58	<5
4SC048S	17 45 0	64 52 8	820	152	34	195	.2	<1.0	1.3	27	<20	<5
4SC049S	17 45 3	64 51 42	180	72	34	15	<.2	<1.0	<1.0	8	<20	<5
4SC050S	17 45 0	64 51 43	570	152	28	30	.3	<1.0	<1.0	11	<20	<5
4SC051S	17 43 47	64 52 38	530	144	48	104	<.2	<1.0	2.0	11	<20	<5
4SC052S	17 43 50	64 51 59	810	83	22	78	<.2	<1.0	1.1	15	<20	<5
4SC053S	17 43 53	64 51 51	350	30	20	26	<.2	<1.0	<1.0	12	<20	<5
4SC054S	17 44 21	64 51 41	670	92	40	160	.4	<1.0	1.0	17	<20	<5
4SC055S	17 44 24	64 51 38	320	120	30	58	<.2	<1.0	<1.0	13	<20	<5
4SC056S	17 44 29	64 51 40	320	122	28	58	<.2	<1.0	1.4	11	<20	<5
4SC057S	17 44 5	64 51 24	305	76	28	32	<.2	<1.0	1.0	10	<20	<5
4SC058S	17 44 26	64 51 12	570	72	15	42	<.2	<1.0	1.2	12	<20	<5
4SC059S	17 44 32	64 50 53	440	85	32	34	<.2	<1.0	1.2	10	<20	<5
4SC060S	17 44 21	64 50 19	530	80	35	42	<.2	<1.0	1.2	12	<20	<5
4SC061S	17 44 7	64 50 2	630	84	21	42	<.2	<1.0	1.0	9	<20	<5
4SC062S	17 44 3	64 49 38	74	34	60	26	.2	<1.0	1.7	8	<20	<5
4SC063S	17 43 26	64 52 0	385	46	44	30	<.2	<1.0	1.0	7	<20	<5
4SC064S	17 42 43	64 52 0	500	92	66	40	<.2	<1.0	<1.0	14	<20	<5
4SC065S	17 42 55	64 51 38	470	148	76	50	<.2	<1.0	1.0	14	<20	<5
4SC066S	17 42 51	64 51 4	470	120	38	72	<.2	<1.0	1.0	12	<20	<5
4SC067S	17 43 4	64 51 12	480	76	65	29	<.2	<1.0	<1.0	12	<20	<5
4SC068S	17 43 4	64 50 40	740	92	68	58	<.2	<1.0	<1.0	17	<20	<5
4SC069S	17 43 6	64 49 58	670	118	36	112	<.2	<1.0	<1.0	25	<20	<5
4SC070S	17 43 55	64 49 21	325	70	84	25	<.2	<1.0	<1.0	20	<20	<5
4SC071S	17 45 34	64 45 50	1,100	114	45	215	<.2	<1.0	<1.0	200	<20	<5
4SC072S	17 46 6	64 45 24	590	50	35	90	<.2	<1.0	<1.0	14	<20	<5
4SC073S	17 45 37	64 45 13	790	66	49	135	<.2	<1.0	<1.0	22	<20	<5
4SC074S	17 45 17	64 46 9	830	70	50	120	<.2	<1.0	1.5	20	<20	<5
4SC075S	17 44 54	64 46 26	860	86	69	64	<.2	<1.0	1.0	15	<20	<5
4SC076S	17 44 46	64 46 52	770	162	57	56	<.2	<1.0	<1.0	15	<20	<5
4SC077S	17 44 37	64 47 18	960	106	36	52	<.2	<1.0	<1.0	20	<20	<5
4SC078S	17 44 29	64 47 46	220	72	75	12	<.2	<1.0	1.3	5	<20	<5
4SC079S	17 44 19	64 46 38	1,050	62	40	28	<.2	<1.0	<1.0	13	<20	13
4SC080S	17 44 10	64 47 2	700	40	29	116	<.2	<1.0	<1.0	7	<20	<5
4SC081S	17 44 3	64 47 28	245	76	660	22	<.2	<1.0	<1.0	63	20	<5
4SC082S	17 43 59	64 46 1	820	66	24	70	<.2	<1.0	<1.0	13	<20	<5
4SC083S	17 44 21	64 45 54	930	72	30	62	<.2	<1.0	<1.0	23	<20	<5
4SC084S	17 44 46	64 46 3	1,050	92	40	120	<.2	<1.0	<1.0	18	<20	<5
4SC085S	17 45 14	64 45 16	850	60	41	50	<.2	<1.0	<1.0	13	<20	<5
4SC086S	17 44 52	64 45 14	900	84	48	76	<.2	<1.0	<1.0	27	<20	<5
4SC087S	17 44 17	64 45 17	450	20	24	32	<.2	<1.0	<1.0	14	<20	<5
4SC088S	17 43 37	64 45 17	930	108	66	140	<.2	<1.0	<1.0	24	<20	<5
4SC089S	17 43 23	64 45 54	800	50	15	58	<.2	<1.0	<1.0	7	<20	<5
4SC090S	17 42 35	64 47 13	790	96	26	122	<.2	<1.0	<1.0	18	<20	<5

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC091S	17 42 54	64 47 27	690	92	20	195	<.2	<1.0	<1.0	11	24	<5
4SC092S	17 43 25	64 47 37	830	72	32	40	<.2	<1.0	<1.0	8	<20	<5
4SC093S	17 43 35	64 47 16	800	56	64	46	<.2	<1.0	<1.0	18	<20	<5
4SC094S	17 43 41	64 46 49	600	55	35	78	<.2	<1.0	<1.0	7	21	<5
4SC095S	17 43 50	64 46 29	810	64	23	130	<.2	<1.0	<1.0	15	<20	<5
4SC096S	17 44 5	64 45 34	620	44	60	100	<.2	<1.0	<1.0	23	22	<5
4SC097S	17 45 38	64 44 44	1,000	118	33	210	<.2	<1.0	<1.0	11	<20	<5
4SC098S	17 45 9	64 44 30	1,050	102	40	102	<.2	<1.0	<1.0	27	<20	<5
4SC099S	17 45 15	64 44 39	360	26	23	34	<.2	<1.0	<1.0	13	24	<5
4SC100S	17 45 13	64 43 36	880	92	42	84	<.2	<1.0	<1.0	18	<20	<5
4SC101S	17 45 5	64 44 4	980	110	43	160	<.2	<1.0	1.0	14	<20	<5
4SC102S	17 44 52	64 43 32	890	105	107	215	<.2	<1.0	1.4	37	46	<5
4SC103S	17 44 15	64 43 15	830	75	64	66	<.2	<1.0	1.2	18	<20	<5
4SC104S	17 44 24	64 43 39	590	24	46	22	<.2	<1.0	1.4	20	<20	<5
4SC105S	17 44 8	64 43 55	700	44	54	88	<.2	<1.0	<1.0	16	29	<5
4SC106S	17 44 24	64 44 43	590	30	36	54	<.2	<1.0	<1.0	19	24	<5
4SC107S	17 44 44	64 44 37	560	30	34	65	<.2	<1.0	<1.0	13	<20	<5
4SC108S	17 44 46	64 44 18	730	32	37	35	<.2	<1.0	<1.0	13	<20	<5
4SC109S	17 43 40	64 44 33	590	55	27	25	<.2	<1.0	<1.0	14	<20	<5
4SC110S	17 43 22	64 44 27	720	48	47	12	<.2	<1.0	<1.0	19	<20	<5
4SC111S	17 43 14	64 44 51	250	20	58	20	<.2	<1.0	<1.0	7	<20	<5
4SC112S	17 43 8	64 45 18	600	40	40	40	<.2	<1.0	<1.0	27	23	<5
4SC113S	17 43 30	64 44 1	770	56	40	52	<.2	<1.0	<1.0	20	<20	<5
4SC114S	17 42 49	64 42 45	740	90	152	70	.5	<1.0	<1.0	275	26	<5
4SC115S	17 42 19	64 42 47	770	172	74	56	<.2	<1.0	<1.0	24	<20	<5
4SC116S	17 42 9	64 43 10	570	138	92	150	.3	<1.0	<1.0	14	<20	<5
4SC117S	17 42 35	64 43 23	450	48	24	38	<.2	<1.0	<1.0	8	<20	<5
4SC118S	17 42 29	64 43 47	770	138	72	265	<.2	<1.0	<1.0	32	<20	<5
4SC119S	17 42 59	64 43 50	600	60	92	30	<.2	<1.0	<1.0	18	<20	<5
4SC120S	17 42 53	64 44 16	590	66	21	48	<.2	<1.0	<1.0	11	<20	<5
4SC121S	17 43 6	64 43 33	890	80	24	80	<.2	<1.0	1.0	18	<20	<5
4SC122S	17 43 16	64 42 54	760	86	36	44	<.2	<1.0	<1.0	9	<20	<5
4SC123S	17 43 40	64 43 29	480	24	30	24	<.2	<1.0	<1.0	<5	<20	<5
4SC124S	17 43 57	64 42 43	195	78	82	20	<.2	<1.0	1.0	9	<20	<5
4SC125S	17 42 55	64 46 52	850	108	44	110	1.7	<1.0	<1.0	36	<20	<5
4SC126S	17 43 9	64 46 27	880	124	72	270	<.2	<1.0	<1.0	21	<20	<5
4SC127S	17 42 5	64 47 17	245	82	600	20	<.2	<1.0	<1.0	22	<20	<5
4SC128S	17 43 17	64 48 8	720	70	82	92	<.2	<1.0	<1.0	14	<20	<5
4SC129S	17 43 48	64 48 20	400	96	58	75	<.2	<1.0	<1.0	28	<20	<5
4SC130S	17 42 52	64 48 3	640	80	47	240	<.2	<1.0	<1.0	24	<20	<5
4SC131S	17 43 2	64 43 51	760	95	41	90	<.2	<1.0	<1.0	22	<20	<5
4SC132S	17 42 37	64 48 40	840	52	50	32	<.2	<1.0	<1.0	17	<20	<5
4SC133S	17 43 0	64 49 18	800	70	68	44	<.2	<1.0	<1.0	17	<20	<5
4SC134S	17 43 25	64 49 26	510	105	38	78	<.2	<1.0	<1.0	22	<20	<5
4SC135S	17 43 34	64 48 59	490	78	70	36	<.2	<1.0	<1.0	20	<20	<5

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC136S	17 42 27	64 49 16	880	78	50	96	<.2	<1.0	<1.0	21	<20	<5
4SC137S	17 41 33	64 48 52	730	98	62	100	<.2	<1.0	1.6	50	<20	<5
4SC138S	17 41 40	64 48 23	890	175	126	128	<.2	<1.0	<1.0	45	<20	<5
4SC139S	17 41 55	64 49 7	870	128	59	96	<.2	<1.0	<1.0	23	<20	<5
4SC140S	17 41 47	64 49 31	1,050	136	46	150	<.2	<1.0	<1.0	35	<20	<5
4SC141S	17 41 21	64 49 25	780	76	56	80	<.2	<1.0	<1.0	16	<20	<5
4SC142S	17 42 16	64 49 43	215	255	4,100	210	<.2	1.0	2.0	4,000	580	<5
4SC143S	17 42 44	64 49 53	1,100	154	89	112	<.2	<1.0	<1.0	38	<20	<5
4SC148S	17 45 38	64 48 50	45	25	42	6	<.2	<1.0	<1.0	<5	<20	<5
4SC150S	17 45 34	64 48 13	125	52	65	40	<.2	<1.0	2.0	14	<20	<5
4SC154S	17 47 26	64 37 32	890	308	118	178	<.2	<1.0	2.2	43	<20	<5
4SC156S	17 47 12	64 37 10	790	128	530	78	<.2	<1.0	<1.0	910	122	<5
4SC157S	17 46 8	64 39 57	75	46	135	38	<.2	<1.0	1.4	76	<20	<5
4SC200S	17 45 20	64 34 6	275	110	405	68	<.2	<1.0	2.6	80	40	<5
4SC201S	17 45 31	64 34 22	34	290	480	260	1.8	2.7	2.5	68	67	<5
4SC202S	17 45 36	64 34 31	540	204	136	112	<.2	<1.0	1.8	54	<20	<5
4SC203S	17 45 34	64 34 39	150	96	102	88	<.2	<1.0	2.2	23	<20	<5
4SC204S	17 45 38	64 34 48	270	100	100	68	<.2	<1.0	1.1	28	<20	<5
4SC205S	17 45 18	64 35 1	380	100	56	62	<.2	<1.0	1.2	30	<20	<5
4SC206S	17 45 13	64 35 33	510	142	70	140	<.2	<1.0	1.0	33	<20	<5
4SC207S	17 44 48	64 36 25	205	82	85	116	<.2	<1.0	1.3	20	<20	<5
4SC208S	17 45 12	64 34 20	240	115	70	62	<.2	<1.0	1.0	21	<20	<5
4SC209S	17 45 0	64 34 35	330	155	104	88	<.2	<1.0	1.4	24	<20	<5
4SC210S	17 45 1	64 34 53	470	156	54	96	<.2	<1.0	<1.0	19	27	<5
4SC211S	17 44 53	64 35 59	570	180	126	240	<.2	<1.0	1.0	49	<20	<5
4SC212S	17 44 36	64 36 37	350	102	77	76	<.2	<1.0	1.2	16	<20	<5
4SC213S	17 44 17	64 37 7	245	38	55	82	<.2	<1.0	<1.0	20	<20	<5
4SC214S	17 44 6	64 37 24	540	70	46	88	<.2	<1.0	<1.0	22	<20	<5
4SC215S	17 44 1	64 37 38	480	155	105	148	<.2	<1.0	1.0	28	<20	<5
4SC216S	17 45 41	64 39 12	430	64	36	74	<.2	<1.0	<1.0	15	<20	<5
4SC217S	17 45 33	64 38 44	120	80	970	48	.4	1.7	6.0	79	76	13
4SC218S	17 45 1	64 38 17	60	150	102	102	1.0	1.2	1.6	14	<20	<5
4SC219S	17 45 24	64 37 38	180	124	71	80	<.2	<1.0	3.2	21	<20	<5
4SC220S	17 45 5	64 37 40	235	96	46	75	.2	<1.0	3.0	10	<20	<5
4SC221S	17 44 56	64 37 33	370	115	79	104	<.2	<1.0	1.0	10	<20	<5
4SC222S	17 44 57	64 37 15	530	205	78	190	<.2	<1.0	2.9	22	<20	<5
4SC223S	17 44 57	64 36 46	340	158	98	82	<.2	<1.0	1.1	20	<20	<5
4SC224S	17 45 14	64 36 23	300	130	70	92	<.2	<1.0	2.3	16	<20	<5
4SC225S	17 44 33	64 38 59	560	158	78	130	<.2	<1.0	<1.0	20	<20	<5
4SC226S	17 44 13	64 38 39	160	70	82	52	.2	<1.0	1.9	25	<20	<5
4SC227S	17 44 20	64 36 56	370	180	1.2	75	<.2	<1.0	<1.0	25	<20	<5
4SC228S	17 44 6	64 36 39	45	56	340	52	.2	1.2	5.7	103	24	<5
4SC229S	17 44 10	64 38 0	600	76	122	36	<.2	<1.0	1.0	182	36	<5
4SC230S	17 43 39	64 38 43	290	105	58	54	.2	<1.0	2.7	11	<20	<5
4SC231S	17 44 12	64 39 3	440	105	81	68	<.2	<1.0	1.0	18	<20	<5

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC232S	17 44 26	64 39 33	190	102	86	74	.2	<1.0	2.9	23	<20	<5
4SC233S	17 44 50	64 38 53	235	104	64	52	<.2	<1.0	1.0	9	<20	<5
4SC234S	17 44 48	64 38 51	510	88	65	66	<.2	<1.0	<1.0	29	<20	<5
4SC235S	17 45 3	64 39 3	440	166	90	96	<.2	<1.0	1.5	22	<20	<5
4SC236S	17 45 6	64 40 4	125	112	77	82	<.2	<1.0	1.3	40	<20	<5
4SC237S	17 44 18	64 41 24	430	138	47	92	<.2	<1.0	<1.0	33	<20	<5
4SC238S	17 44 2	64 41 31	175	98	84	36	.2	<1.0	1.0	43	<20	<5
4SC239S	17 43 59	64 41 30	560	142	77	72	<.2	<1.0	<1.0	62	<20	<5
4SC240S	17 44 5	64 41 17	560	92	40	76	<.2	<1.0	1.0	91	<20	<5
4SC241S	17 43 10	64 41 27	220	82	120	35	<.2	<1.0	<1.0	50	<20	<5
4SC242S	17 43 13	64 40 42	360	90	82	85	<.2	<1.0	<1.0	13	<20	<5
4SC243S	17 43 22	64 41 42	100	130	135	115	.9	1.2	<1.0	28	61	<5
4SC244S	17 43 8	64 41 14	530	118	120	42	<.2	<1.0	<1.0	24	<20	<5
4SC245S	17 43 46	64 40 10	320	142	102	98	.2	<1.0	1.4	16	<20	<5
4SC246S	17 44 37	64 40 29	275	128	280	46	<.2	<1.0	2.2	16	<20	<5
4SC247S	17 44 30	64 40 53	420	158	58	125	.2	<1.0	<1.0	16	<20	<5
4SC248S	17 44 34	64 40 47	320	122	75	54	<.2	<1.0	1.2	20	<20	<5
4SC249S	17 45 31	64 40 19	590	182	89	45	<.2	<1.0	<1.0	31	<20	<5
4SC250S	17 44 47	64 41 22	130	88	130	28	.2	<1.0	1.7	19	82	<5
4SC251S	17 44 26	64 41 39	510	160	120	65	<.2	<1.0	<1.0	28	<20	<5
4SC252S	17 44 28	64 41 47	810	264	92	82	<.2	<1.0	<1.0	33	<20	<5
4SC253S	17 44 43	64 42 2	300	110	80	32	.2	1.0	1.3	80	<20	<5
4SC254S	17 44 27	64 42 4	380	196	85	56	<.2	<1.0	<1.0	27	<20	<5
4SC255S	17 44 17	64 42 37	185	84	90	44	.3	1.0	<1.0	22	<20	<5
4SC256S	17 43 54	64 42 19	620	40	83	40	<.2	<1.0	<1.0	24	22	<5
4SC257S	17 43 25	64 42 4	810	174	74	88	<.2	<1.0	<1.0	47	94	<5
4SC258S	17 43 30	64 42 13	60	70	112	44	.6	<1.0	1.8	19	<20	<5
4SC259S	17 42 38	64 42 14	68	82	330	48	.3	1.0	5.8	28	<20	<5
4SC260S	17 46 58	64 45 0	450	60	130	72	<.2	<1.0	<1.0	44	45	<5
4SC261S	17 46 24	64 45 1	740	86	56	105	<.2	<1.0	<1.0	29	<20	<5
4SC262S	17 46 34	64 45 4	85	52	91	50	.4	<1.0	<1.0	15	<20	<5
4SC263S	17 46 9	64 44 59	820	85	55	92	<.2	<1.0	<1.0	27	<20	<5
4SC264S	17 46 16	64 44 25	115	105	100	130	.6	1.0	5.2	17	47	<5
4SC265S	17 45 31	64 40 42	265	70	115	32	.3	<1.0	5.9	16	<20	<5
4SC266S	17 41 43	64 53 15	870	100	118	10	<.2	<1.0	<1.0	52	<20	<5
4SC267S	17 41 19	64 52 49	720	110	127	130	<.2	<1.0	<1.0	120	<20	<5
4SC268S	17 41 29	64 52 14	860	52	90	20	<.2	<1.0	<1.0	36	<20	<5
4SC269S	17 41 30	64 51 47	770	78	54	55	<.2	<1.0	<1.0	28	<20	<5
4SC270S	17 41 33	64 50 53	58	222	650	135	1.9	1.8	6.4	170	21	<5
4SC271S	17 41 38	64 51 22	800	64	120	38	<.2	<1.0	<1.0	22	<20	<5
4SC272S	17 42 6	64 50 37	560	72	200	22	<.2	<1.0	<1.0	24	<20	<5
4SC273S	17 41 9	64 50 15	260	90	1,000	16	<.2	<1.0	<1.0	72	<20	<5
4SC274S	17 41 33	64 50 25	180	44	390	24	<.2	<1.0	<1.0	12	<20	<5
4SC275S	17 42 8	64 51 5	145	40	430	15	<.2	<1.0	<1.0	64	51	10
4SC276S	17 42 0	64 52 20	920	60	72	15	<.2	<1.0	<1.0	30	<20	<5

TABLE 2. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. CROIX, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
4SC277S	17 41 52	64 52 43	780	62	68	12	<.2	<1.0	<1.0	26	<20	<5
4SC278S	17 42 13	64 51 46	910	40	62	22	<.2	<1.0	<1.0	30	<20	<5
4SC279S	17 42 30	64 51 9	770	72	92	52	<.2	<1.0	<1.0	25	<20	<5
4SC280S	17 42 35	64 50 40	165	45	240	15	.3	<1.0	<1.0	10	52	11
4SC281S	17 41 34	64 49 27	710	76	138	35	<.2	<1.0	<1.0	47	39	<5
4SC282S	17 41 53	64 49 47	400	36	76	30	<.2	<1.0	<1.0	13	<20	<5
4SC283S	17 42 30	64 49 47	770	46	62	54	<.2	<1.0	<1.0	14	<20	<5
4SC284S	17 42 38	64 50 13	420	46	74	32	<.2	<1.0	<1.0	16	<20	<5
4SC285S	17 45 23	64 41 35	56	110	360	20	.5	1.2	3.0	43	59	<5
4SC286S	17 44 24	64 40 13	345	124	118	36	<.2	<1.0	1.0	72	<20	<5
4SC287S	17 43 12	64 41 40	54	560	1,200	400	4.9	2.2	1.6	900	206	<5
4SC288S	17 43 26	64 41 44	165	52	300	26	.4	<1.0	1.0	17	<20	<5
4SC289S	17 43 38	64 41 42	370	82	124	18	<.2	<1.0	<1.0	38	23	<5
4SC290S	17 43 41	64 41 36	510	168	114	72	<.2	<1.0	1.2	28	<20	<5
4SC291S	17 43 49	64 41 30	910	105	58	58	<.2	<1.0	1.3	18	<20	<5
4SC292S	17 44 2	64 41 30	95	80	120	32	.6	1.0	2.2	17	<20	<5
4SC293S	17 44 26	64 41 31	430	235	110	48	<.2	<1.0	1.0	31	<20	<5
4SC294S	17 44 39	64 41 46	270	158	86	32	<.2	<1.0	1.0	19	<20	<5
4SC295S	17 44 32	64 41 47	300	176	142	36	<.2	<1.0	1.6	23	31	<5
4SC296S	17 44 23	64 41 39	540	155	190	40	<.2	<1.0	<1.0	20	<20	<5
4SC297S	17 44 8	64 41 40	610	162	110	48	<.2	<1.0	<1.0	58	<20	<5
4SC298S	17 44 10	64 41 52	600	154	140	76	<.2	<1.0	1.8	46	<20	<5
4SC300S	17 45 42	64 50 41	190	92	100	56	.3	<1.0	<1.0	24	<20	<5

TABLE 3. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. THOMAS, U.S. VIRGIN ISLANDS
 [N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
3ST001S	18 20 46	64 53 14	38	65	310	34	.2	<1.0	<1.0	130	118	<5
3ST002S	18 20 48	64 52 44	350	70	45	64	<.2	<1.0	<1.0	34	20	<5
3ST003S	18 20 23	64 51 58	280	140	58	120	<.2	<1.0	<1.0	37	<20	<5
3ST004S	18 19 15	64 50 24	385	92	108	45	<.2	<1.0	<1.0	68	<20	8
3ST007S	18 18 41	64 49 41	270	200	570	105	<.2	<1.0	<1.0	500	42	<5
3ST008S	18 17 52	64 49 2	28	46	550	54	<.2	<1.0	2.0	594	86	<5
3ST009S	18 18 0	64 49 25	48	68	140	65	<.2	<1.0	1.3	101	20	5
3ST010S	18 18 6	64 49 34	68	115	220	68	<.2	<1.0	1.2	164	<20	8
3ST011S	18 18 10	64 49 44	70	105	520	56	.2	<1.0	1.3	590	176	<5
3ST012S	18 18 54	64 50 50	290	145	2,800	82	<.2	<1.0	1.0	3,000	1,400	5
3ST013S	18 18 33	64 51 52	90	180	1,700	100	.2	<1.0	<1.0	2,300	273	7
3ST014S	18 18 26	64 52 14	30	64	370	58	.2	1.2	7.0	248	39	<5
3ST015S	18 18 24	64 52 28	830	330	265	150	<.2	<1.0	<1.0	185	<20	7
3ST017S	18 19 18	64 56 34	165	170	605	110	.2	<1.0	1.0	157	<20	<5
3ST018S	18 19 19	64 57 7	135	140	215	85	<.2	<1.0	<1.0	125	<20	<5
3ST019S	18 18 42	64 57 37	105	200	240	85	.2	<1.0	1.0	229	<20	5
3ST021S	18 18 27	65 0 6	1,050	300	375	185	<.2	<1.0	<1.0	409	20	20
3ST022S	18 21 15	64 59 39	540	150	150	60	<.2	<1.0	<1.0	63	20	<5
3ST023S	18 20 47	64 58 36	420	270	1,100	345	<.2	<1.0	<1.0	1,800	300	<5
3ST024S	18 20 21	64 50 42	150	105	375	96	.2	1.0	<1.0	98	<20	<5
3ST025S	18 21 17	64 52 54	125	105	420	96	.2	1.0	1.5	127	<20	<5
3ST027S	18 21 52	64 53 35	58	120	430	100	5.4	15.0	250.0	284	108	<5
3ST030S	18 24 35	64 54 29	110	125	580	70	.2	2.2	3.5	113	<20	<5
3ST031S	18 22 1	64 54 24	150	86	340	9	<.2	<1.0	<1.0	57	40	<5
3ST044S	18 22 24	64 59 27	27	105	1,250	46	.6	2.4	7.5	790	203	<5
3ST045S	18 20 4	64 56 15	76	66	195	64	<.2	<1.0	1.0	339	114	6
3ST046S	18 19 42	64 56 7	34	175	505	60	.7	3.0	2.9	106	41	5
3ST049S	18 18 58	64 53 28	490	130	330	68	<.2	<1.0	1.0	326	20	<5
3ST052S	18 19 48	64 57 31	100	90	215	32	<.2	<1.0	<1.0	250	70	<5
3ST062S	18 22 52	65 3 40	120	120	1,050	80	<.2	<1.0	<1.0	1,400	423	<5
3ST063S	18 24 20	65 3 36	1,100	98	220	110	.7	<1.0	<1.0	420	354	<5
3ST067S	18 19 41	64 51 14	130	88	115	85	.2	<1.0	1.3	85	36	7
3ST068S	18 19 59	64 51 14	180	175	200	30	<.2	<1.0	<1.0	45	<20	<5
3ST069S	18 19 36	64 51 40	300	160	68	66	<.2	<1.0	1.4	51	<20	<5
3ST070S	18 19 40	64 52 23	300	230	160	73	<.2	<1.0	1.6	70	<20	<5
3ST071S	18 19 42	64 52 25	105	72	125	82	2.0	<1.0	5.0	86	53	<5
3ST072S	18 19 19	64 53 29	76	100	135	25	<.2	1.0	1.2	45	20	<5
3ST073S	18 19 27	64 53 28	380	190	110	110	<.2	<1.0	<1.0	79	<20	20
3ST074S	18 20 5	64 53 3	470	125	100	310	<.2	<1.0	1.4	124	35	<5
3ST075S	18 19 44	64 53 0	170	100	170	36	<.2	<1.0	<1.0	55	20	<5
3ST076S	18 19 34	64 54 35	425	220	170	78	<.2	<1.0	<1.0	207	<20	<5
3ST077S	18 19 12	64 54 42	16	44	155	38	.2	<1.0	1.2	115	39	<5
3Si078S	18 19 11	64 53 59	430	56	74	100	<.2	<1.0	<1.0	73	20	<5
3ST079S	18 19 30	64 54 16	600	175	130	72	<.2	<1.0	<1.0	73	<20	<5
3ST081S	18 20 18	64 54 24	810	235	56	185	<.2	<1.0	<1.0	57	<20	<5

TABLE 3. DATA RESULTS FOR WATER-EXTRACTABLE IONS FROM B-HORIZON SOILS, ST. THOMAS, U.S. VIRGIN ISLANDS--Continued

Sample	LAT	LONG	CA(PPM)	MG(PPM)	NA(PPM)	K(PPM)	ZN(PPM)	CU(PPM)	AG(PPB)	CL(PPM)	SO4(PPM)	F(PPM)
3ST082S	18 20 12	64 54 12	310	190	135	25	<.2	<1.0	<1.0	135	20	<5
3ST083S	18 20 15	64 53 30	550	200	205	92	<.2	<1.0	<1.0	127	<20	<5
3ST085S	18 21 32	64 54 30	80	38	115	16	<.2	<1.0	<1.0	105	33	<5
3ST086S	18 21 17	64 55 16	225	175	200	49	<.2	<1.0	<1.0	147	20	12
3ST087S	18 21 43	64 56 31	790	290	180	130	<.2	<1.0	<1.0	194	20	<5
3ST088S	18 22 11	64 57 8	710	205	215	180	<.2	<1.0	<1.0	324	33	<5
3ST089S	18 22 9	64 57 38	550	220	230	39	<.2	<1.0	<1.0	305	61	24
3ST090S	18 21 52	64 58 35	600	270	92	97	<.2	<1.0	1.0	99	20	<5
3ST091S	18 21 39	65 0 55	660	180	130	50	<.2	<1.0	1.0	160	<20	<5
3ST092S	18 21 32	65 1 5	160	72	115	47	<.2	<1.0	<1.0	96	20	5
3ST093S	18 21 4	65 1 22	100	55	300	16	<.2	<1.0	<1.0	141	36	<5
3ST094S	18 20 45	65 1 22	250	130	260	85	<.2	<1.0	1.0	22	<20	<5
3ST095S	18 21 15	65 0 10	125	60	385	18	<.2	<1.0	<1.0	32	20	<5
3ST096S	18 21 28	65 1 55	710	220	115	60	<.2	<1.0	<1.0	51	<20	<5
3ST097S	18 20 44	64 56 55	850	205	67	155	<.2	<1.0	<1.0	40	<20	<5
3ST098S	18 20 49	64 57 8	350	120	72	68	<.2	<1.0	<1.0	40	20	<5
3ST099S	18 20 58	64 57 46	150	38	2,550	14	<.2	<1.0	2.0	1,190	3,330	5
3ST102S	18 18 28	64 50 0	1,000	440	120	215	<.2	<1.0	<1.0	76	<20	<5
3ST103S	18 18 57	64 49 55	495	225	230	105	<.2	<1.0	<1.0	190	<20	<5
3ST104S	18 21 33	64 50 21	145	28	810	30	<.2	<1.0	<1.0	624	235	<5
3ST105S	18 21 44	64 49 32	355	92	470	125	<.2	<1.0	<1.0	404	69	5
3ST106S	18 21 43	64 49 42	225	160	270	88	<.2	<1.0	1.3	69	<20	<5
3ST108S	18 21 50	64 52 12	110	120	345	100	<.2	<1.0	2.0	231	56	<5
3ST109S	18 21 34	64 51 46	1,100	270	1,950	155	<.2	<1.0	<1.0	3,600	716	<5
3ST110S	18 20 48	64 51 45	640	155	200	96	<.2	<1.0	<1.0	161	<20	<5
3ST111S	18 19 52	64 50 47	15	48	690	42	.5	1.8	10.0	139	123	<5