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The Chemical Analysis of Water and Sediments in the Genesee River Watershed Study

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THE CHEMICAL ANALYSIS OF WATER AND SEDIMENTS IN THE GENESEE RIVER WATERSHED STUDY

SUMMARY OF PROCEDURES

PREPARED BY

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This document describes the analytical procedures currently used at the Environmental Health Center, New York State Department of Health, for the chemical analysis of water and sediments in the Genesee River Watershed Study.

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II. SEDIMENT ANALYSIS (FLOW CHART)

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Water Column Analysis

The methods outlined in this manual for water column analysis have been used during the past seven years in the New York State Department of Health eutrophication research program directed by Dr. G. W. Fuhs.

A flow diagram of the sample handling and preservation techniques for nutrients and trace metals is presented in Fig. 1. The sample is split into several subsamples as required. If dissolved and particulate analyses are desired, a 300-ml subsample is filtered in the field through a 0.45-µm Celite-coated Millipore filter. The filtrate and the resuspended residue are then analyzed for dissolved and particulate material respectively. Aliquots of the acidified subsample are used for trace metal analysis by flame atomic absorption spectrophotometry. Separate aliquots are used for the determination of arsenic and mercury.

The statistical information presented for each parameter was obtained in this laboratory during 1975.

The range reported refers to the actual working range used in this laboratory in routine analysis of large numbers of samples.

Minimum reportable concentration indicates the lowest result reported for an analytical determination. This value corresponds to an estimate of the result which is different from zero at the 95% confidence level. Results that are smaller than one-half the minimum reportable concentration are reported as "less than" values.

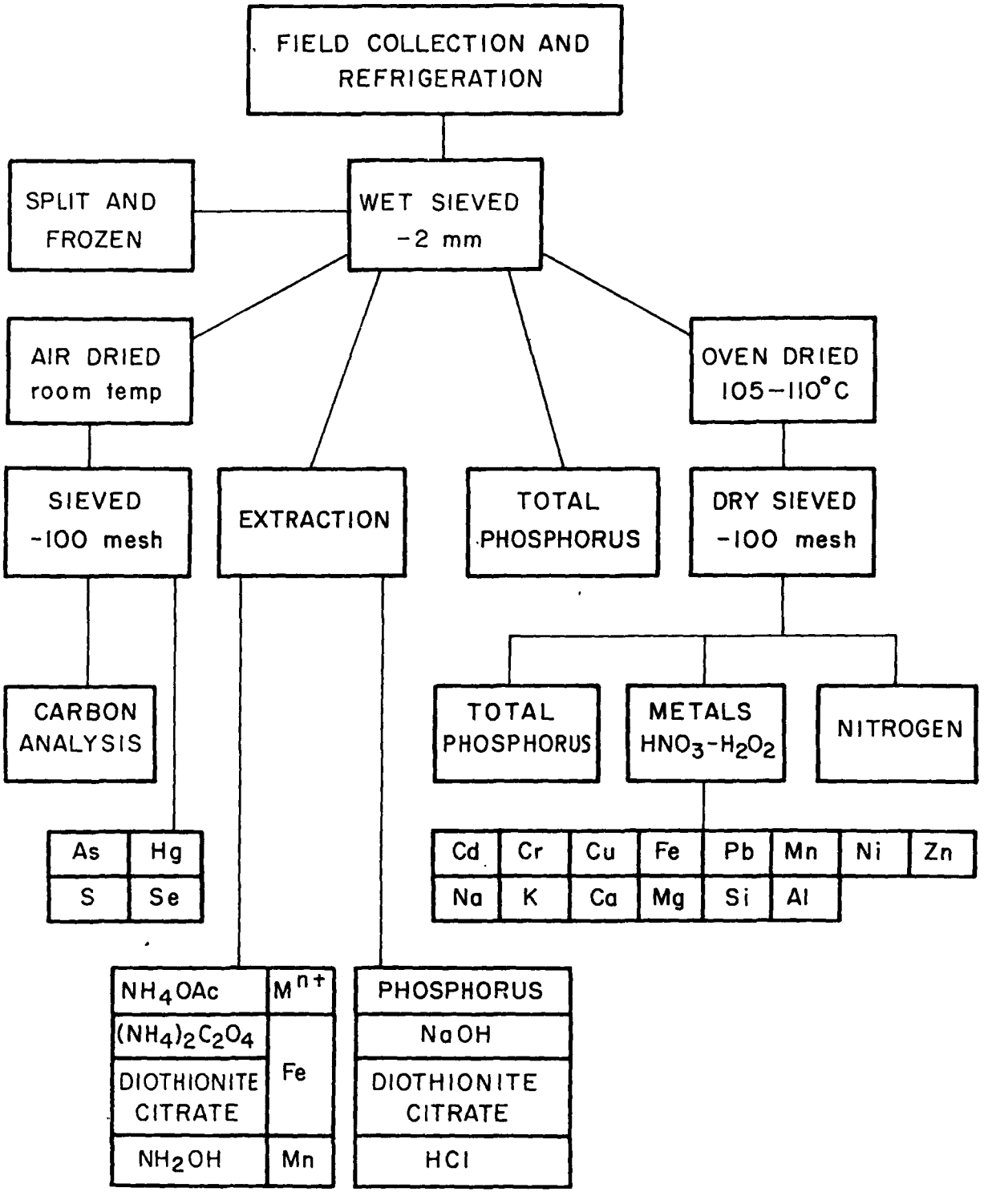
Significance threshold represents the smallest value reported with two significant figures.

For all procedures described here blanks and quality control check samples (either supplied by the National Bureau of Standards or secondary standards calibrated by this laboratory) are routinely analyzed. Periodic evaluation of procedures and computational methods is also done routinely.

Abbreviations used in this manual:

APHA	American Public Health Association
EPA	(United States) Environmental Protection Agency
NYSDH	New York State Department of Health
RSD	Relative Standard Deviation
USGS	United States Geological Survey

SEDIMENT ANALYSIS FLOW CHART



NITROGEN, total particulate Kjeldahl (Micro)	PARAMETER # 033409

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter coated with Celite. Residue and Celite are resuspended in 10 ml of NH_3- free distilled water.

PRESERVATION: Resuspended residue frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: A 2 ml slurry of the residue and Celite is digested with acid. Nitrogen is determined by the Indophenol blue method: NH_3 is reacted with phenol and hypochlorite in alkaline medium to form a blue complex.

INSTRUMENTATION: Bausch and Lomb 400 Spectrophotometer with digital printout

RANGE: 30-600 µg N/liter

QUANTITY ANALYZED: 2 ml (Celite slurry)

PRECISION: Not available

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 2, 8, 16, 18, 20

C. DATA REPORT:

UNITS: µg N/liter

MINIMUM REPORTABLE CONCENTRATION: 30 µg N/liter

SIGNIFICANCE THRESHOLD: Not available

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NITROGEN, total dissolved including NH_3, Kjeldahl	PARAMETER # 006401

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 100-ml aliquot filtered through a prewashed 0.45-µm Millipore filter coated with Celite

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: A 25-ml aliquot of filtered water sample is digested with acid. Nitrogen is determined by the Indophenol blue method: NH_3 is reacted with phenol and hypochlorite in alkaline medium to form a blue complex.

INSTRUMENTATION: Bausch and Lomb 400 Spectrophotometer with digital printout

RANGE: 0.05-0.50 mg N/liter

QUANTITY ANALYZED: 25 ml

PRECISION: RSD 35% at 0.26 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 2, 6, 8, 16, 18, 20

C. DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg N/liter

SIGNIFICANCE THRESHOLD: 0.10 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NITROGEN, total dissolved including NH_3, Kjeldahl	PARAMETER # 006401

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 100-ml aliquot filtered through a prewashed 0.45-μm Millipore filter coated with Celite

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: A 25-ml aliquot of filtered water sample is digested with acid. Nitrogen is determined by the Indophenol blue method: NH_3 is reacted with phenol and hypochlorite in alkaline medium to form a blue complex.

INSTRUMENTATION: Bausch and Lomb 400 Spectrophotometer with digital printout

RANGE: 0.05-0.50 mg N/liter

QUANTITY ANALYZED: 25 ml

PRECISION: RSD 35% at 0.26 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 2, 6, 8, 16, 18, 20

C. DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg N/liter

SIGNIFICANCE THRESHOLD: 0.10 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NITROGEN, ammonia as N in water	PARAMETER # 000501

Effective date 4/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Indophenol blue: NH_3 is reacted with phenol and hypochlorite in alkaline medium to form a blue complex. Nitroprusside is used as a catalyst to facilitate color development at 37.5°C.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 0.05-0.50 mg N/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 18% at 0.10 mg N/liter
5.7% at 0.46 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 4, 8, 18, 19, 20

C. DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg N/liter

SIGNIFICANCE THRESHOLD: 0.10 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NITROGEN, ammonia as N in water	PARAMETER # 000501

Effective date 8/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Indophenol blue: NH_3 is reacted with phenol and hypochlorite in alkaline medium to form a blue complex. Nitroprusside is used as a catalyst to facilitate color development at 37.5°C.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 0.005 - 0.1 mg N/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 19% at 0.047 mg N/liter
10% at 0.090 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 4, 8, 18, 19, 20

C. DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.005 mg N/liter

SIGNIFICANCE THRESHOLD: 0.01 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

nitrate as N in water	# 000801

Effective date 3/1/75

SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45 µm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

METHOD: Nitrate passed through a 'Cd-Cu Reductor' is reduced to nitrite which is reacted with sulfanilamide. The diazo compound is coupled with 1-naphthylethylene diamine to yield a highly colored azo dye. Its color intensity is measured spectrophotometrically.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 0.2-2.5 mg N/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 3.1% at 0.65 mg N/liter
2.7% at 1.9 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 4, 8, 20, 21

DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.2 mg N/liter

SIGNIFICANCE THRESHOLD: 1.0 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NITROGEN, nitrate as N in water	PARAMETER # 000801

Effective date 8/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45 µm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Nitrate passed through a 'Cd-Cu Reductor' is reduced to nitrite which is reacted with sulfanilamide. The diazo compound is coupled with 1-naphthylethylene diamine to yield a highly colored azo dye. Its color intensity is measured spectrophotometrically.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 0.03-0.7 mg N/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 18% at 0.067 mg N/liter
8.3% at 0.25 mg N/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 4, 8, 20, 21

C. DATA REPORT:

UNITS: mg N/liter

MINIMUM REPORTABLE CONCENTRATION: 0.03 mg N/liter

SIGNIFICANCE THRESHOLD: 0.1 mg N/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

PHOSPHORUS, total dissolved as P in water	PARAMETER # 107201

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter coated with Celite

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: $K_2S_2O_8$ in acid medium oxidizes organic phosphorus to orthophosphate. The orthophosphate is converted to phosphomolybdate and reduced to molybdenum blue by adding ascorbic acid. The intensity of blue color is measured spectrophotometrically.

INSTRUMENTATION: Bausch and Lomb Spectrophotometer with digital printout

RANGE: 0.002-0.100 mg P/liter

QUANTITY ANALYZED: 50 ml

PRECISION: RSD 9.3% at 0.021 mg/l

INTERFERENCES 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 7, 8, 17, 20

C. DATA REPORT:

UNITS: mg P/liter

MINIMUM REPORTABLE CONCENTRATION: 0.002 mg P/liter

SIGNIFICANCE THRESHOLD: 0.01 mg P/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

PHOSPHORUS, total particulate as P	PARAMETER # 107001

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter coated with Celite. Residue and Celite are resuspended in 10 ml of phosphate-free distilled water.

PRESERVATION: Resuspended residue frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: A 4-ml slurry of the residue and Celite is digested with alkaline $K_2S_2O_8$. The orthophosphate is converted to phosphomolybdate which is reduced to molybdenum blue by ascorbic acid. The intensity of blue color is measured spectrophotometrically.

INSTRUMENTATION: Bausch and Lomb Spectrophotometer with Digital Printout

RANGE: 0.002-0.10 mg P/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 14.9% at 0.20 mg P/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 7, 8, 9, 17, 20

C. DATA REPORT:

UNITS: mg P/liter

MINIMUM REPORTABLE CONCENTRATION: 0.002 mg P/liter

SIGNIFICANCE THRESHOLD: 0.01 mg P/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

PHOSPHORUS, orthophosphates as P in water	PARAMETER # 106901

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Orthophosphate is converted to phosphomolybdate and molybdate reduced to molybdenum blue with ascorbic acid. The intensity of blue color is measured spectrophotometrically.

INSTRUMENTATION: Bausch and Lomb Spectrophotometer with Digital Printout

RANGE: 0.002-0.100 mg P/liter

QUANTITY ANALYZED: 5 ml (Celite slurry)

PRECISION: RSD 4.8% at 0.025 mg P/liter
14.6% at 0.013 mg P/liter

INTERFERENCES: 20

STATUS: NYSDH, APHA, EPA

REFERENCES: 8, 17, 20

C. DATA REPORT:

UNITS: mg P/liter

MINIMUM REPORTABLE CONCENTRATION: 0.002 mg P/liter

SIGNIFICANCE THRESHOLD: 0.010 mg P/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CARBON, dissolved organic

PARAMETER # 030501

Effective date 3/24/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-µm Millipore filter coated with Celite

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Organic carbon in the filtered sample is oxidized with $K_2S_2O_8$ at 175°C and 8 Kg/cm^2 pressure. The CO_2 produced is determined by infrared measurement.

INSTRUMENTATION: Carbon Analyzer - Oceanography International Corp.

RANGE: 1-40 mg C/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 6% at 7.9 mg/liter

INTERFERENCES: 10

STATUS: EPA

REFERENCES: 5, 8, 10

C. DATA REPORT:

UNITS: mg C/liter

MINIMUM REPORTABLE CONCENTRATION: 1 mg C/liter

SIGNIFICANCE THRESHOLD: 1 mg C/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CARBON, particulate organic	PARAMETER # 030601

Effective date 3/24/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polypropylene bottle

PRETREATMENT: 300-ml aliquot filtered through a prewashed 0.45-μm Millipore filter coated with Celite. Residue and Celite are resuspended in 10 ml of CO_2-free distilled water.

PRESERVATION: Resuspended residue frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: A 1-ml slurry of the residue and Celite is oxidized with $K_2S_2O_8$ at 175°C and 8 Kg/cm^2 pressure. This is followed by infrared determination of the CO_2 produced.

INSTRUMENTATION: Carbon Analyzer - Oceanography International Corp.

RANGE: 0.13-6.0 mg C/liter

QUANTITY ANALYZED: 1 ml (Celite slurry)

PRECISION: RSD 14% at 1.2 mg C/liter
27% at 0.9 mg C/liter

INTERFERENCES: 10

STATUS: EPA

REFERENCES: 5, 8, 10

C. DATA REPORT:

UNITS: mg C/liter

MINIMUM REPORTABLE CONCENTRATION: 0.13 mg C/liter

SIGNIFICANCE THRESHOLD: Not available

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CHLORIDE in water	PARAMETER # 001001

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 300-ml aliquot filtered through 0.45-μm Millipore filter

PRESERVATION: Filtered aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Thiocyanate (SCN^-) ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form un-ionized $HgCl_2$. In presence of ferric ion, the liberated SCN^- forms a deep red complex in concentration proportional to the original Cl^- concentration.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 3-50 mg Cl^-/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 2.3% at 8.3 mg Cl^-/liter
2.9% at 38 mg Cl^-/liter

INTERFERENCES: 8

STATUS: EPA

REFERENCES: 1, 4, 8

C. DATA REPORT:

UNITS: mg Cl^-/liter

MINIMUM REPORTABLE CONCENTRATION: 3 mg Cl^-/liter

SIGNIFICANCE THRESHOLD: 10 mg Cl^-/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

SILICON as SiO_2	PARAMETER # 013801

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: None

PRESERVATION: 100-ml aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: SiO_2 reacts with ammonium molybdate at pH 1.2 to form yellow molybdosilicic acid. This is reduced by amino-naphthsulfonic acid to heteropoly blue which is measured spectrophotometrically.

INSTRUMENTATION: Bausch and Lomb 400 Spectrophotometer

RANGE: 0.2 - 2 mg SiO_2/liter

QUANTITY ANALYZED: 10 ml

PRECISION: RSD 73% at 0.3 mg SiO_2/liter
40% at 0.6 mg SiO_2/liter

INTERFERENCES: 20

STATUS: APHA, EPA

REFERENCES: 8, 20

C. DATA REPORT:

UNITS: mg SiO_2/liter

MINIMUM REPORTABLE CONCENTRATION: 0.2 mg SiO_2/liter

SIGNIFICANCE THRESHOLD: 1.0 mg SiO_2/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

SULFATE in water	PARAMETER # 002401

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 3 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: None

PRESERVATION: 100-ml aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: The reagent is equimolar $BaCl_2$ and MTB (methyl thymol blue). By pH-control the Ba^{2+}-indicator chelate is prevented from forming at first. After sufficient time is allowed for the precipitation of $BaSO_4$ the solution is made basic and the uncombined MTB is determined spectrophotometrically.

INSTRUMENTATION: Technicon AutoAnalyzer

RANGE: 2-30 mg SO_4^{2-}/liter

QUANTITY ANALYZED: 4 ml

PRECISION: RSD 3% at 30 mg SO_4^{2-}/liter
8% at 7.6 mg SO_4^{2-}/liter

INTERFERENCES: 14

STATUS: Experimental

REFERENCES: 14

C. DATA REPORT:

UNITS: mg SO_4^{2-}/liter

MINIMUM REPORTABLE CONCENTRATION: 2 mg SO_4^{2-}/liter

SIGNIFICANCE THRESHOLD: 10 mg SO_4^{2-}/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

ARSENIC in water	PARAMETER # 009301

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Arsenic is reduced to AsH_3 by zinc and absorbed in a pyridine solution of Ag-diethyldithiocarbamate to yield a red complex. Its color intensity is measured spectrophotometrically. Predigestion is required if water sample is turbid or preserved by HNO_3.

INSTRUMENTATION: Bausch and Lomb Spectrophotometer with Digital Printout

RANGE: 0.02-0.15 mg As/liter

QUANTITY ANALYZED: 100 ml

PRECISION: RSD 16.9% at 0.16 mg As/liter

INTERFERENCES: 20

STATUS: APHA, EPA, USGS

REFERENCES: 8, 11, 20, 22

C. DATA REPORT:

UNITS: mg As/liter

MINIMUM REPORTABLE CONCENTRATION: 0.02 mg As/liter

SIGNIFICANCE THRESHOLD: 0.1 mg As/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CADMIUM in water	PARAMETER # 009701

Effective date 6/11/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (228.8 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.02-0.5 mg Cd/liter

QUANTITY ANALYZED: 5 ml

PRECISION: Not available

INTERFERENCES: 23

STATUS: USGS, EPA

REFERENCES: 23

C. DATA REPORT:

UNITS: mg Cd/liter

MINIMUM REPORTABLE CONCENTRATION: 0.02 mg Cd/liter

SIGNIFICANCE THRESHOLD: 0.1 mg Cd/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CALCIUM in water	PARAMETER # 011401

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (422.7 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.5-30 mg Ca/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 12% at 30 mg Ca/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Ca/liter

MINIMUM REPORTABLE CONCENTRATION: 0.5 mg Ca/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Ca/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CHROMIUM in water	PARAMETER # 009801

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (357.9 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: 0.1-1.0 mg Cr/liter

QUANTITY ANALYZED: 5 ml

PRECISION: Not available

INTERFERENCES: 8

STATUS: USGS

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Cr/liter

MINIMUM REPORTABLE CONCENTRATION: 0.1 mg Cr/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Cr/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

COBALT in water	PARAMETER # 011601

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (240.7 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.1-1.0 mg Co/liter

QUANTITY ANALYZED: 5 ml

PRECISION:

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Co/liter

MINIMUM REPORTABLE CONCENTRATION: 0.1 mg Co/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Co/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

COPPER in water	PARAMETER # 009901

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (324.7 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.05-5.0 mg Cu/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 11.9% at 0.22 mg Cu/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Cu/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg Cu/liter

SIGNIFICANCE THRESHOLD: 0.1 mg Cu/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

IRON in water	PARAMETER # 010001

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (248.3 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.05-1.5 mg Fe/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 18.4% at 0.14 mg Fe/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Fe/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg Fe/liter

SIGNIFICANCE THRESHOLD: 0.1 mg Fe/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

LEAD in water	PARAMETER # 010101

Effective date 6/11/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic Absorption (217.0 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: 0.1-2.5 mg Pb/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 73% at 0.2 mg Pb/liter

INTERFERENCES: 23

STATUS: USGS, EPA

REFERENCES: 23

C. DATA REPORT:

UNITS: mg Pb/liter

MINIMUM REPORTABLE CONCENTRATION: 0.1 mg Pb/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Pb/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MAGNESIUM in water	PARAMETER # 012601

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (285.2 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.1-10 mg Mg/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 4.8% at 6.7 mg Mg/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Mg/liter

MINIMUM REPORTABLE CONCENTRATION: 0.1 mg Mg/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Mg/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MANGANESE in water	PARAMETER # 010201

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic Absorption (279.5 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: 0.02-2.5 mg Mn/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 12.5% at 0.11 mg Mn/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Mn/liter

MINIMUM REPORTABLE CONCENTRATION: 0.02 mg Mn/liter

SIGNIFICANCE THRESHOLD: 0.10 mg Mn/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MERCURY in water	PARAMETER # 010301

Effective date 9/4/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (253.7 nm)

INSTRUMENTATION: Varian AA-4 atomic absorption spectrophotometer

RANGE: 0.0004-0.0036 mg Hg/liter

QUANTITY ANALYZED: 50 ml

PRECISION: RSD 6.6% at 0.0017 mg Hg/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Hg/liter

MINIMUM REPORTABLE CONCENTRATION: 0.0004 mg Hg/liter

SIGNIFICANCE THRESHOLD: 0.001 mg Hg/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NICKEL in water	PARAMETER # 012801

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (232.0 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: 0.05-1.5 mg Ni/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 17.5% at 0.22 mg Ni/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Ni/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg Ni/liter

SIGNIFICANCE THRESHOLD: 0.1 mg Ni/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

POTASSIUM in water	PARAMETER # 010401

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (766.5 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.1-5.0 mg K/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 18.3% at 0.9 mg K/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg K/liter

MINIMUM REPORTABLE CONCENTRATION: 0.1 mg K/liter

SIGNIFICANCE THRESHOLD: 1.0 mg K/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

SODIUM in water	PARAMETER # 010701

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (589.0 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomet

RANGE: 0.5-100 mg Na/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 9.5% at 52 mg Na/liter

INTERFERENCES: 8

STATUS: USGS, EPA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Na/liter

MINIMUM REPORTABLE CONCENTRATION: 0.5 mg Na/liter

SIGNIFICANCE THRESHOLD: 1.0 mg Na/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

ZINC in water	PARAMETER # 010901

Effective date 3/1/75

A. SAMPLING:

COLLECTION: 1-4 liters using a depth-integrating sampler

CONTAINER: Polyethylene bottle

PRETREATMENT: 5 ml conc HNO_3 added per liter of sample

PRESERVATION: Aliquot frozen at site in dry-ice chest

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (213.9 nm)

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 0.05-1.5 mg Zn/liter

QUANTITY ANALYZED: 5 ml

PRECISION: RSD 8.7% at 0.23 mg Zn/liter

INTERFERENCES: 8

STATUS: EPA, USGA

REFERENCES: 8, 22, 23

C. DATA REPORT:

UNITS: mg Zn/liter

MINIMUM REPORTABLE CONCENTRATION: 0.05 mg Zn/liter

SIGNIFICANCE THRESHOLD: 0.10 mg Zn/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

Sediment Analysis

Although several sediment analysis schemes are available in the literature, the following flow chart has been specially developed for fluvial sediments.

Using a regular sediment sampler or plastic shovel, bottom materials are collected and placed in a plastic pail. After wet-sieving with a 2-mm plastic sieve and discarding material > 2mm, the sample is split into several subsamples. Some are used wet, some air-dried, some oven-dried (105-110°C), and some frozen for preservation. The wet-sieved (-2 mm) sample is used directly for extractable nutrients and for trace metals and other ions. The dried samples are ground, homogenized, sieved through a 100-mesh plastic sieve, and stored for further analysis. The air-dried sample is used to analyze for carbon and such volatile elements as sulfur, selenium, arsenic, and mercury. The oven-dried sample is used for the analysis of nitrogen, phosphorus, and metals.

Metals are analyzed for by first preparing a HNO_3-H_2O_2-digested extract of an oven-dried, sieved aliquot. A 50-ml stock solution is prepared from the digestate and analyzed directly or diluted to bring the solution concentration to the correct range for analysis.

The statistical information presented for each parameter was obtained in this laboratory during 1975.

The range reported refers to the actual working range used in this laboratory in routine analysis of large numbers of samples.

Minimum reportable concentration indicates the lowest result reported for an analytical determination. This value corresponds to an estimate of the result which is different from zero at the 95% confidence level. Results that are smaller than one-half the minimum

reportable concentration are reported as "less than" values.

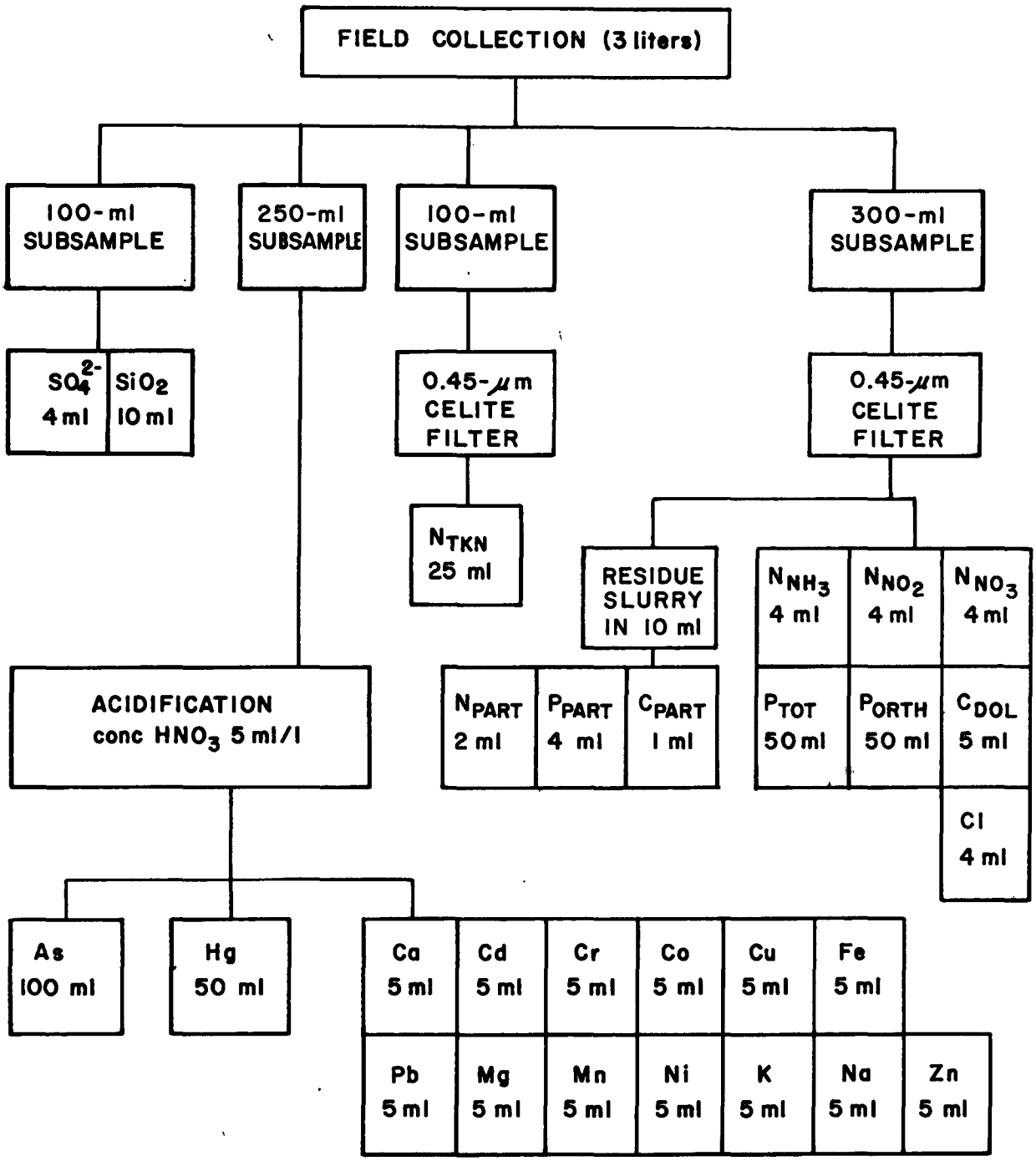
Significance threshold represents the smallest value reported with two significant figures.

For all procedures described here blanks and quality control check samples (either supplied by the National Bureau of Standards or secondary standards calibrated by this laboratory) are routinely analyzed. Periodic evaluation of procedures and computational methods is also done routinely.

Abbreviations used in this manual:

APHA	American Public Health Association
EPA	(United States) Environmental Protection Agency
NYSDH	New York State Department of Health
RSD	Relative Standard Deviation
USGS	United States Geological Survey

WATER COLUMN ANALYSIS



NITROGEN, total N in dry solids	PARAMETER # 36008

Effective date 11/1/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet sieved; material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Air-dried, homogenized and sieved (-100 mesh). Sample is directly used for analysis in the P & E 240 CHN Analyzer. Approximately 5-500 mg samples are used.

INSTRUMENTATION: Perkin-Elmer 240 Elemental Analyzer

RANGE: 0.010-20%

QUANTITY ANALYZED: 5-500 mg

PRECISION: 23% at 0.057% N

INTERFERENCES: 15

STATUS: NYSDH

REFERENCES: 15

C. DATA REPORT:

UNITS: Percent

MINIMUM REPORTABLE CONCENTRATION: 0.01%

SIGNIFICANCE THRESHOLD: 0.10%

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

PHOSPHORUS, total P in dry solids	PARAMETER # 036108

Effective date 3/1/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Alkaline $K_2S_2O_8$ digestion of the homogenized (-100 mesh) oven-dried sample results in orthophosphate formation. Determined spectrophotometrically by molybdenum blue method. Approximately 0.2-g samples are used.

INSTRUMENTATION: Rausch and Lomb 400 Spectrophotometer with digital printout

RANGE: 0.002 - 0.100 mg P/liter

QUANTITY ANALYZED: 0.2 g

PRECISION: RSD 14.9% at 0.19 mg P/liter

INTERFERENCES: 20

STATUS: APHA, EPA

REFERENCES: 7, 8, 9, 17, 20

C. DATA REPORT:

UNITS: Percent

MINIMUM REPORTABLE CONCENTRATION: 0.002 mg P/liter

SIGNIFICANCE THRESHOLD: 0.010 mg P/liter

FORMAT: Computer Line Printer Output with Magnetic Tape Sto

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CARBON, total in dry solids	PARAMETER #136208

Effective date 1/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet sieved; material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Air-dried, homogenized and sieved (-100 mesh). Sample is directly used for analysis in the Perkin-Elmer 240 Elemental Analyzer. Approximately 5-500 mg samples are used.

INSTRUMENTATION: Perkin-Elmer 240 Elemental Analyzer

RANGE: 0.01 - 60%

QUANTITY ANALYZED: 5-500 mg

PRECISION: 20% at 0.5% C

INTERFERENCES: 15

STATUS: NYSDH

REFERENCES: 15

C. DATA REPORT:

UNITS: Percent

MINIMUM REPORTABLE CONCENTRATION: 0.01%

SIGNIFICANCE THRESHOLD: 0.10%

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CARBON, total organic in dry solids	PARAMETER # 036208

Effective date: 11/1/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Air-dried, homogenized, and sieved (-100 mesh) sample is directly used for analysis in the Perkin-Elmer 240 CHN Analyzer. Sample is treated with phosphoric acid before combustion to decompose carbonates. Approximately 5-500 mg samples are used.

INSTRUMENTATION: Perkin-Elmer 240 Elemental Analyzer

RANGE: 0.1 - 10%

QUANTITY ANALYZED: 2 mg

PRECISION: RSD 6% at 2.2% C

INTERFERENCES: 15

STATUS: NYSDH

REFERENCES: 15

C. DATA REPORT:

UNITS: Percent

MINIMUM REPORTABLE CONCENTRATION: 0.10%

SIGNIFICANCE THRESHOLD: 0.10%

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

ARSENIC, extractable in sediment	PARAMETER # 009303

Effective date 7/1/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Air-dried, homogenized and sieved (-100 mesh) sample is digested with conc H_2SO_4 and H_2O_2 and the extract is diluted. The silver diethyl dithiocarbamate method is used to determine As. Approximately 1-g samples are used and the volume of the extract is 100 ml.

INSTRUMENTATION: Bausch and Lomb 400 Spectrophotometer with digital printout

RANGE: 2-15 µg As/g

QUANTITY ANALYZED: 1 g

PRECISION: Not available

INTERFERENCES: 11, 20

STATUS: APHA, USGS

REFERENCES: 11, 20

C. DATA REPORT:

UNITS: µg As/g dry solid

MINIMUM REPORTABLE CONCENTRATION: 2 µg As/g

SIGNIFICANCE THRESHOLD: Not available

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CALCIUM, extractable in sediment

PARAMETER # 011403

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: ≤ 2 days

B. METHOD: Atomic absorption (422.7 nm)
Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution with distilled water.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: 50-3000 µg Ca/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 12% at 3000 µg Ca/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Ca/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 50 µg Ca/g

SIGNIFICANCE THRESHOLD: 100 µg Ca/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CADMIUM, extractable in sediment	PARAMETER # 009703

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (228.8 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 3-21 µg Cd/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 5% at 19.7 µg Cd/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Cd/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 2 µg Cd/g

SIGNIFICANCE THRESHOLD: 10 µg Cd/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

CHROMIUM, extractable in sediment	PARAMETER # 009803

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (357.9 nm)
Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 12-850 µg Cr/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 35% at 23 µg Cr/g
16% at 730 µg Cr/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Cr/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 10 µg Cr/g

SIGNIFICANCE THRESHOLD: 100 µg Cr/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

COPPER, extractable in sediment	PARAMETER # 009903

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (324.7 nm)
Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 13-1010 µg Cu/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 14% at 15 µg Cu/g
6% at 920 µg Cu/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Cu/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 5 µg Cu/g

SIGNIFICANCE THRESHOLD: 10 µg C/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

IRON, extractable in sediment	PARAMETER # 010003

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > .2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (248,3 nm)
Approximately 0.5-g samples are digested with HNO_3—H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotomete

RANGE: (sediments) 9×10^3 - 7.2×10^4 µg Fe/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 19% at 1.1×10^4 µg Fe/g
14% at 6.1×10^4 µg Fe/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Fe/g dry sample

MINIMUM REPORTABLE CONCENTRATION: .5 µg Fe/g

SIGNIFICANCE THRESHOLD: 10 µg Fe/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storag

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

LEAD, extractable in sediment	PARAMETER # 010103

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (217.0 nm)
Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 10-770 µg Pb/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 40% at 21 µg Pb/g
2% at 750 µg Pb/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Pb/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 10 µg Pb/g

SIGNIFICANCE THRESHOLD: 100 µg Pb/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MAGNESIUM, extractable in sediment	PARAMETER # 012603

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (285.2 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 10 - 1000 µg Mg/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 4.8% at 660 µg Mg/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Mg/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 10 µg Mg/g

SIGNIFICANCE THRESHOLD: 100 µg Mg/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MANGANESE, extractable in sediment	PARAMETER # 010203

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (279.5 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 120-1800 µg Mn/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 14% at 150 µg Mn/g
10% at 570 µg Mn/g

INTERFERENCES: Not available

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Mn/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 2 µg Mn/g

SIGNIFICANCE THRESHOLD: 10 µg Mn/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

MERCURY in sediment	PARAMETER # 010303

Effective date 3/1/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (253.7 nm) Air-dried, sieved (-100 mesh) sample is digested with H_2SO_4 and $KMnO_4$ and the extract diluted. Approximately 1-g samples are used.

INSTRUMENTATION: Varian AA-4 atomic absorption spectrophotomet

RANGE: Not available

QUANTITY ANALYZED: 1 g

PRECISION: Not available

INTERFERENCES: 23

STATUS: USGS

REFERENCES: 23

C. DATA REPORT:

UNITS: µg Hg/g dry sample

MINIMUM REPORTABLE CONCENTRATION: Not available

SIGNIFICANCE THRESHOLD: Not available

FORMAT: Computer Line Printer Output with Magnetic Tape Stora

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

NICKEL, extractable in sediment	PARAMETER # 012803

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (232.0 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 5 - 80 µg Ni/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 15% at 30 µg Ni/g
10% at 73 µg Ni/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Ni/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 5 µg Ni/g

SIGNIFICANCE THRESHOLD: 10 µg Ni/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

POTASSIUM, extractable in sediment	PARAMETER # 010403

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved; material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (766.5 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 10 - 500 µg K/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 18% at 90 µg K/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg K/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 10 µg K/g

SIGNIFICANCE THRESHOLD: 100 µg K/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

SODIUM, extractable in sediment	PARAMETER # 010703

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (589.0 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: 50 - 10,000 µg Na/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 9.5% at 5200 µg Na/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Na/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 50 µg Na/g

SIGNIFICANCE THRESHOLD: 100 µg Na/g

FORMAT: Computer Line Printer Output with Magnetic Tape Storage

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

ZINC, extractable in sediment	PARAMETER # 010903

Effective date 6/11/75

A. SAMPLING: See sediment analysis flow chart

COLLECTION: Bottom sampler or plastic shovel

CONTAINER: Plastic pail

PRETREATMENT: Bed material is wet-sieved, and material > 2 mm is discarded.

PRESERVATION: Several split samples frozen and stored

TRANSIT TIME: < 2 days

B. METHOD: Atomic absorption (213.9 nm) Approximately 0.5-g samples are digested with HNO_3-H_2O_2 and the digestate Made to 50 ml stock solution.

INSTRUMENTATION: Varian AA-5 atomic absorption spectrophotometer

RANGE: (sediments) 13-1400 µg Zn/g

QUANTITY ANALYZED: 0.5 g 5 ml digestate

PRECISION: RSD 29% at 18 µg Zn/g
28% at 1130 µg Zn/g

INTERFERENCES: 23

STATUS: Experimental

REFERENCES: 13, 23

C. DATA REPORT:

UNITS: µg Zn/g dry sample

MINIMUM REPORTABLE CONCENTRATION: 5 µg Zn/g

SIGNIFICANCE THRESHOLD: 10 µg Zn/g

FORMAT: Computer Line Printer Output with Magnetic Tape

REPORTED BY: Environmental Health Center
Division of Laboratories and Research
New York State Department of Health

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