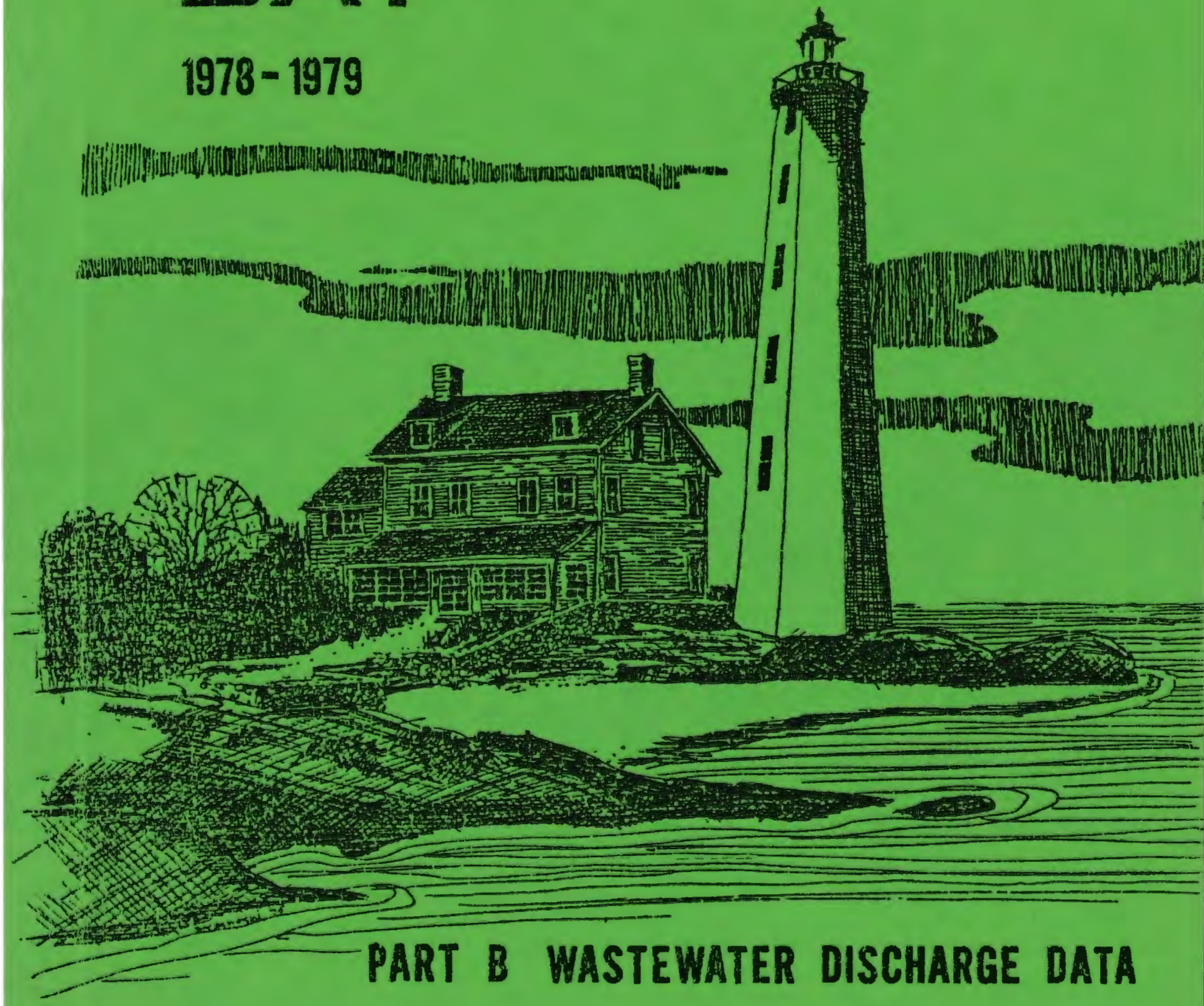
BUZZARDS BAY

1978 - 1979



PART B WASTEWATER DISCHARGE DATA

department of environmental quality engineering

DIVISION OF WATER POLLUTION CONTROL

thomas c. mcmahon, director

BUZZARDS BAY
1978 - 1979
WASTEWATER DISCHARGE SURVEY DATA

Prepared by
Water Quality and Research Section
Massachusetts Division of Water Pollution Control

Westborough, Massachusetts
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INTRODUCTION

This report presents samples collected from the major municipal wastewater discharges and some industrial wastewater discharges. The sampling occurred from October 23 to October 26, 1978, and again from August 27 to August 29, 1979. Sampling was conducted by personnel of the Water Quality and Research Section of the Division of Water Pollution Control in Westborough, with assistance from the personnel at the municipal and industrial wastewater treatment facilities.

Composite samples were collected at the municipal wastewater treatment plants. Grab samples were taken from the industrial plants and the minor sewage treatment facilities. Flow rates were obtained from plant records.

All samples were conveyed to the Lawrence Experiment Station of the Massachusetts Department of Environmental Quality Engineering for analysis. Samples collected were analyzed in accordance with APHA's Standard Methods for Examination of Water and Wastewater, current edition.

BUZZARDS BAY BASIN

WASTEWATER DISCHARGES

NUMBER	MUNICIPAL
1	Dartmouth Wastewater Treatment Plant
2	Fairhaven Wastewater Treatment Plant
3	Marion Wastewater Treatment Plant
4	New Bedford Wastewater Treatment Plant
5	Wareham Wastewater Treatment Plant

INDUSTRIAL, BUSINESS, INSTITUTIONAL WASTEWATER DISCHARGES

6	Acushnet Company, Golf Division, Acushnet
7	Acushnet Company, Rubber Division, New Bedford
8	Chamberland Manufacturing Company, New Bedford
9	Lincoln Park Amusement Company, Dartmouth
10	Massachusetts Maritime Academy, Bourne
11	Old Rochester High School, Mattapoisett
12	Revere Copper & Brass, New Bedford

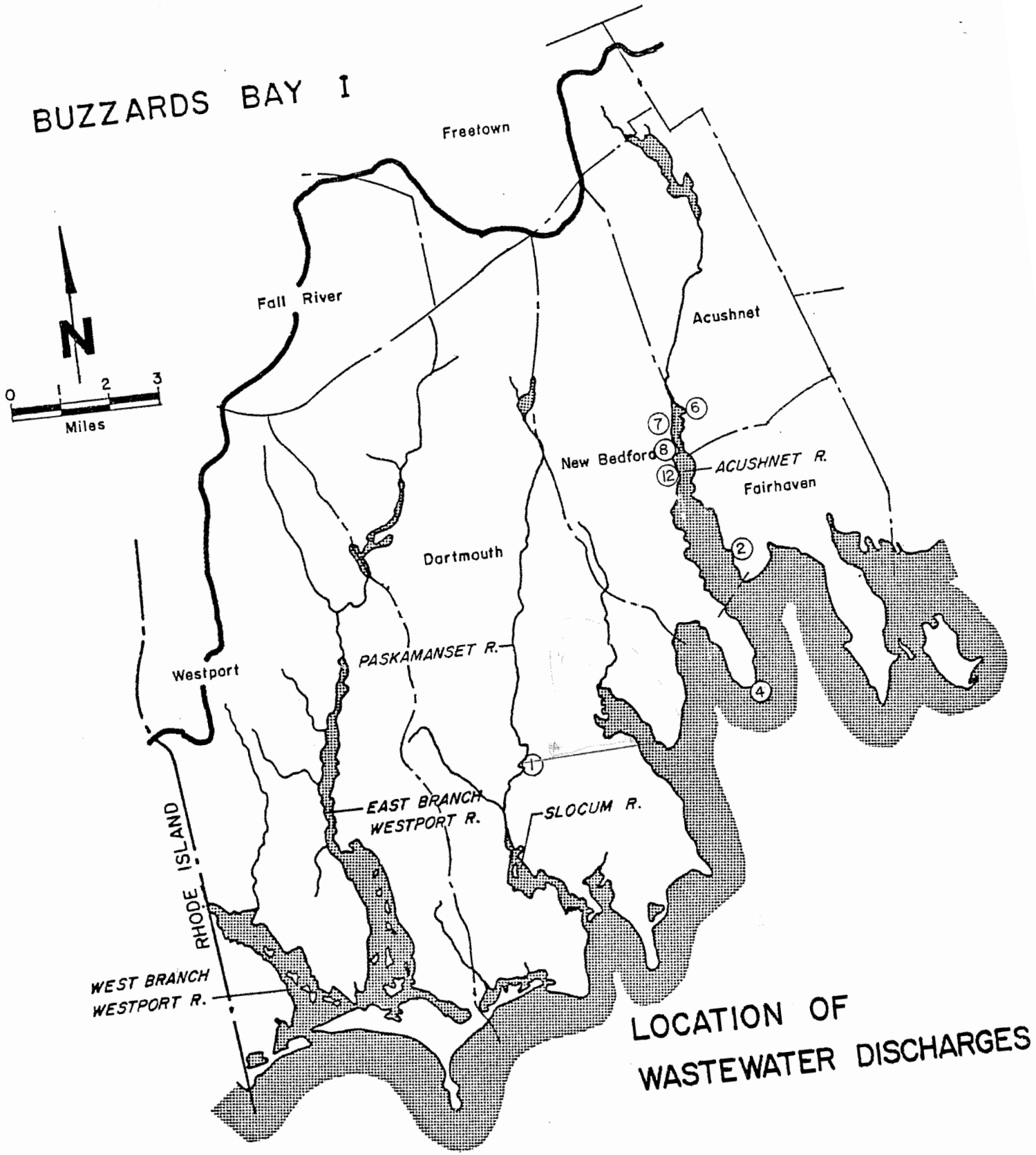
BUZZARDS BAY I
Freetown
Fall River
Acushnet
N
0
2
3
Miles
New Bedford
ACUSHNET R.
Fairhaven
Dartmouth
PASKAMANSET R.
Westport
EAST BRANCH
WESTPORT R.
SLOCUM R.
RHODE ISLAND
WEST BRANCH
WESTPORT R.
LOCATION OF
WASTEWATER DISCHARGES

FIGURE I

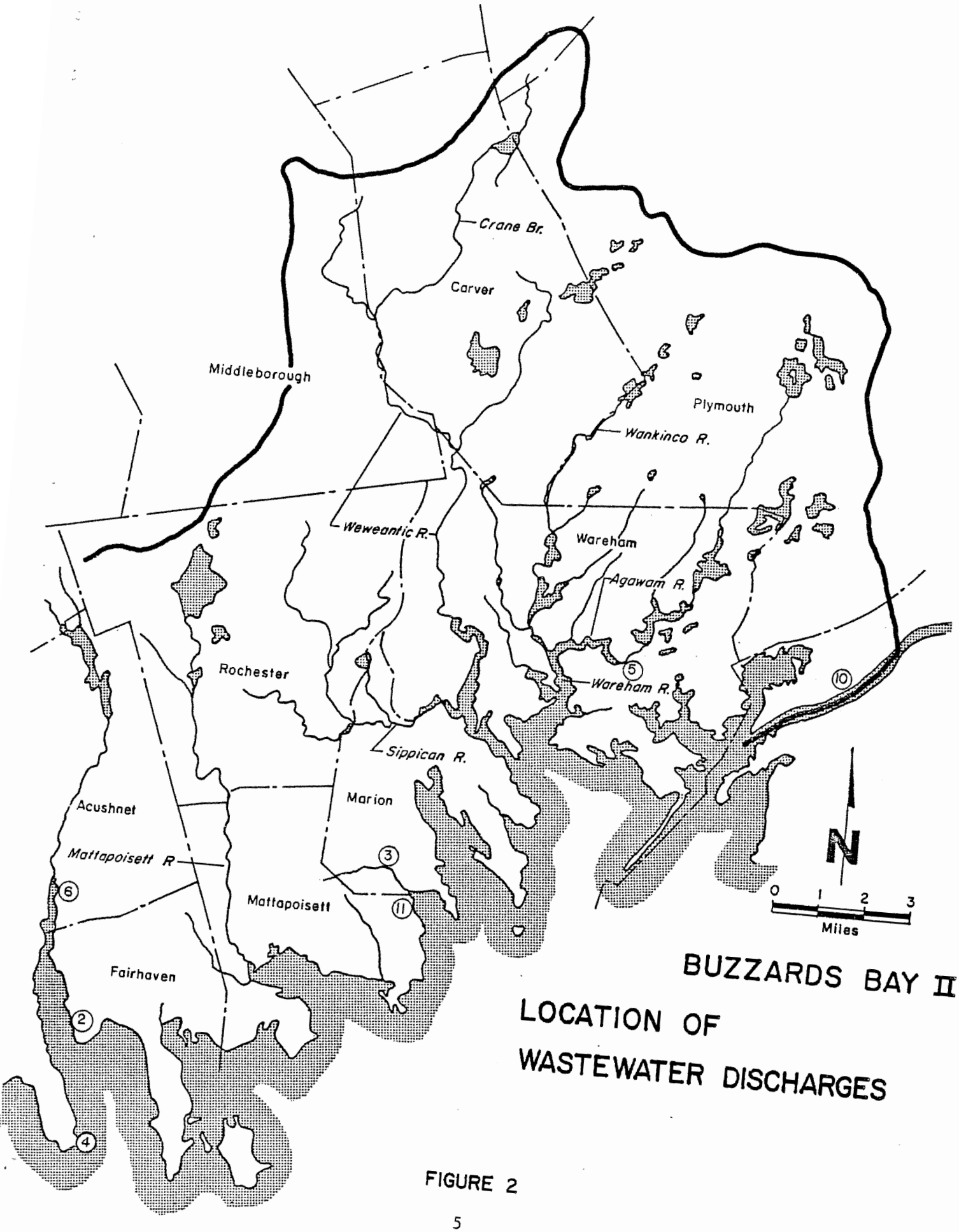
Crane Br.
Carver
Middleborough
Plymouth
Wankinco R.
Weweantic R.
Wareham
Agawam R.
Rochester
Wareham R.
Sippican R.
Marion
Acushnet
Mattapoisett R.
Mattapoisett
Fairhaven
N
0 1 2 3
Miles
BUZZARDS BAY II
LOCATION OF
WASTEWATER DISCHARGES

FIGURE 2

DARTMOUTH WASTEWATER TREATMENT PLANT

LOCATION:	759 Russells Mill Road South Dartmouth, Massachusetts
RECEIVING WATER:	Buzzards Bay
CAPACITY:	2.1 MGD
TREATMENT PROCESS:	Extended aeration Chlorination
SLUDGE DISPOSAL:	Landfilled at municipal site
TYPE OF SAMPLE:	Two 24-hour composites of the effluent Two grab samples after chlorination for coliform bacteria One 24-hour composite of the influent

DARTMOUTH WASTEWATER TREATMENT PLANT

RESULTS OF LABORATORY ANALYSES (mg/l)

	1978 INFLUENT	1978 EFFLUENT		1979 EFFLUENT	
PARAMETER	10/24-10/25	10/24-10/25	10/25-10/26	8/27-8/28	8/28-8/29
COD	510	70	86	--	--
BOD_5	222	13	64	7.2	7.5
pH (Standard Units)	7.4	7.2	7.2	7.3	7.3
Suspended Solids	368	9.0	15	1.5	6.0
Total Solids	762	410	406	374	380
Settleable Solids (ml/l)	--	0.0	0.3	0.2	0.2
Total Alkalinity	192	88	97	57	41
Total Kjeldahl-Nitrogen	52	12	10	8.9	3.1
Ammonia-Nitrogen	28	0.77	1	0.33	0.11
Nitrate-Nitrogen	0.0	15	12	6.6	9.8
Total Phosphorus	10	12	12	4.3	5.0
Total Coliform (#/100 ml)	--	3,000	--	30	60
Fecal Coliform (#/100 ml)	--	<5	--	<5	20
Total Chlorine Residual	--	--	--	--	1.3
Flow (MGD)	0.72	0.72	0.73	0.908	0.940

FAIRHAVEN WASTEWATER TREATMENT PLANT

LOCATION:	Arsene Street Fairhaven, Massachusetts
RECEIVING WATER:	Acushnet River (the inner New Bedford Harbor)
CAPACITY:	2.1 MGD
TREATMENT PROCESS:	Extended aeration Chlorination
SLUDGE DISPOSAL:	Landfilled at municipal site
TYPE OF SAMPLE:	Two 24-hour composite samples of the effluent Two grab samples after chlorination for coliform bacteria
COMMENTS:	No chlorine was found in the effluent

FAIRHAVEN WASTEWATER TREATMENT PLANT

RESULTS OF LABORATORY ANALYSES (mg/l)

PARAMETER	1978 INFLUENT 10/24-10/25	1978 EFFLUENT 10/24-10/25	1978 EFFLUENT 10/25-10/26	1979 EFFLUENT 8/27-8/28	1979 EFFLUENT 8/28-8/29
COD	560	320	320	--	--
BOD_5	140	20	17	17	11
pH (Standard Units)	7.1	7.5	7.5	7.1	7.2
Suspended Solids	138	10	11	14	7.3
Total Solids	3,128	2,858	3,250	3,164	3,358
Settleable Solids (ml/l)	--	0.0	0.0	0.1	0.1
Total Alkalinity	146	133	152	20	73
Total Kjeldahl-Nitrogen	42	28	16	15	10
Ammonia-Nitrogen	24	15	14	3.2	3.8
Nitrate-Nitrogen	0.11	3.1	4.0	20	1.2
Total Phosphorus	4.1	7.5	5.9	2.3	2.3
Total Coliform (#/100 ml)	--	7,500	--	1.5×10^6	<10
Fecal Coliform (#/100 ml)	--	<5	--	0.3×10^6	<5
Total Chlorine Residual	--	--	--	0.0	--
Flow (MGD)	1.13	1.13	0.95	1.07	--

MARION WASTEWATER TREATMENT PLANT

LOCATION:	43 Pumping Station Road Marion, Massachusetts
RECEIVING WATER:	Tributary to Aucoot Cove
CAPACITY:	0.34 MGD
TREATMENT PROCESS:	Stabilization ponds Sand filters Chlorination
SLUDGE DISPOSAL:	Landfilled at municipal site
TYPE OF SAMPLE:	Two 24-hour composites of the effluent Two grab samples after chlorination for coliform bacteria One grab sample of the effluent

MARION WASTEWATER TREATMENT PLANT

RESULTS OF LABORATORY ANALYSES (mg/1)

	1978 INFLUENT	1978 EFFLUENT	1979 EFFLUENT	
PARAMETER	10/25	10/25	8/27-8/28	8/28-8/29
COD	230	120	--	--
BOD_5	120	30	14	9.0
pH (Standard Units)	7.1	6.9	7.6	6.9
Suspended Solids	138	24	12	12
Total Solids	666	362	292	296
Settleable Solids (ml/l)	--	0.0	--	10
Total Alkalinity	134	33	41	43
Total Kjeldahl-Nitrogen	34	4.2	5.3	5.6
Ammonia-Nitrogen	23	1.4	1.2	1.5
Nitrate-Nitrogen	0.9	0.4	1.2	1.6
Total Phosphorus	3.9	2.2	2.7	2.7
Total Coliform (#/100 ml)	--	<10	200	20
Fecal Coliform (#/100 ml)	--	<5	<5	<5
Total Chlorine Residual	--	--	1.5	1.5
Flow (MGD)	0.28	0.28	0.34	0.35

NEW BEDFORD WASTEWATER TREATMENT PLANT

LOCATION:	Fort Rodman New Bedford, Massachusetts
RECEIVING WATER:	New Bedford Harbor
CAPACITY:	30 MGD
TREATMENT PROCESS:	Primary Chlorination
SLUDGE DISPOSAL:	Landfilled on site
TYPE OF SAMPLE:	Two 24-hour composite samples of the effluent Two grab samples after chlorination for coliform bacteria. One grab sample of the influent One 24-hour composite sample of the effluent

NEW BEDFORD WASTEWATER TREATMENT PLANT

RESULTS OF LABORATORY ANALYSES (mg/1)

PARAMETER	1978 INFLUENT 10/24	1978 EFFLUENT 10/23-10/24	1979 EFFLUENT 8/27-8/28	1979 EFFLUENT 8/28-8/29
COD	323	274	--	--
BOD_5	150	96	54	87
pH (Standard Units)	7.5	7.1	7.0	6.9
Suspended Solids	92	90	74	90
Total Solids	906	1,846	4,662	2,790
Settleable Solids (ml/1)	--	0.9	1.9	0.8
Total Alkalinity	121	68	61	97
Total Kjeldahl-Nitrogen	35	32	21	25
Ammonia-Nitrogen	16	13	12	11
Nitrate-Nitrogen	0.0	0.0	0.1	0.1
Total Phosphorus	4.9	2.5	3.9	3.8
Total Coliform (#/100 ml)	--	430	2.4×10^6	0.93×10^6
Fecal Coliform (#/100 ml)	--	<36	0.93×10^6	0.24×10^6
Flow (MGD)	22	22	24.8	24.5

WAREHAM WASTEWATER TREATMENT PLANT

LOCATION:	Route 6 Wareham, Massachusetts
RECEIVING WATER:	Agawam River
CAPACITY:	1.75 MGD
TREATMENT PROCESS:	Extended aeration Sand filters Chlorination
SLUDGE DISPOSAL:	Landfilled at municipal site
TYPE OF SAMPLE:	Two 24-hour composite samples of the effluent Two grab samples after chlorination for bacteria Three 24-hour composite samples of the effluent One 24-hour composite sample of the influent

WAREHAM WASTEWATER TREATMENT PLANT

RESULTS OF LABORATORY ANALYSES (mg/l)

	1978	1978			1979	
	INFLUENT	EFFLUENT			EFFLUENT	
PARAMETER	10/28	10/24-10/25	10/25-10/26	10/26-10/27	8/27-8/28	8/28-8/29
COD	--	48	5.0	--	--	--
BOD_5	--	4.8	4.8	--	14	1.8
pH (Standard Units)	7.2	4.8	5.0	--	6.7	5.6
Suspended Solids	130	13	5.0	1.0	23	2.0
Total Solids	560	420	440	412	534	420
Settleable Solids (ml/l)	--	0.0	0.1	0.0	0.2	0.0
Total Alkalinity	159	2.0	4.0	--	21	6
Total Kjeldahl-Nitrogen	50	3.6	6.0	--	6.1	4.5
Ammonia-Nitrogen	31	1.4	2.3	--	1.1	1.6
Nitrate-Nitrogen	0.0	19	19	--	19	14
Total Phosphorus	5.1	5.8	0.95	--	7.0	2.2
Total Coliform (#/100 ml)	--	--	--	<5	--	<5
Fecal Coliform (#/100 ml)	--	--	--	<5	--	<5
Total Chlorine Residual	--	--	--	--	1.5	1.5
Flow (MGD)	0.26	0.27	0.26	0.26	0.385	0.427

ACUSHNET COMPANY, GOLF DIVISION

LOCATION:	Slocum Street Acushnet, Massachusetts
RECEIVING WATER:	Acushnet River
CAPACITY:	Varies with flow
TREATMENT PROCESS:	pH adjustment
SLUDGE DISPOSAL:	Not applicable
TYPE OF SAMPLE:	A grab sample of the effluent from discharge 010

ACUSHNET COMPANY, GOLF DIVISION, ACUSHNET

RESULTS OF LABORATORY ANALYSES (mg/l)

	EFFLUENT	
PARAMETER	10/26/78	8/28/79
COD	--	48
pH (Standard Units)	--	7.7
Suspended Solids	--	6.5
Total Solids	--	108
Settleable Solids (ml/l)	--	0.0
Ammonia-Nitrogen	--	0.33
Nitrate-Nitrogen	--	0.1
Total Phosphorus	--	0.3
Oil and Grease	--	10
Lead	--	0.00
Nickel	--	0.00
Zinc	0.0	0.02
Flow (MGD)	--	1.28

ACUSHNET COMPANY, RUBBER DIVISION

LOCATION:	744 Belleville Avenue New Bedford, Massachusetts
RECEIVING WATER:	Acushnet River
CAPACITY:	Varies with flow
TREATMENT PROCESS:	None
SLUDGE DISPOSAL:	Not applicable
TYPE OF SAMPLE:	A grab sample of the effluent

ACUSHNET COMPANY, RUBBER DIVISION, NEW BEDFORD

RESULTS OF LABORATORY ANALYSES (mg/l)

1979

PARAMETER	EFFLUENT 8/29
COD	5
pH (Standard Units)	7.9
Suspended Solids	6.5
Total Solids	92
Total Alkalinity	23
Total Phosphorus	0.25
Oil and Grease	6.0
Chromium, Total	0.00
Chromium, Hexavalent	0.000
Flow (MGD)	0.718

CHAMBERLAND MANUFACTURING COMPANY

LOCATION:	117 King Street New Bedford, Massachusetts
RECEIVING WATER:	Nash Road Pond and Copper Brook
CAPACITY:	Varies with flow
TREATMENT PROCESS:	Oil Separator
TYPE OF SAMPLE:	Grab sample of the effluent from discharge 002

CHAMBERLAND MANUFACTURING COMPANY

RESULTS OF LABORATORY ANALYSES (mg/l)

PARAMETER	EFFLUENT 10/25/78
Chromium, Total	0.00
Chromium, Hexavalent	0.00
Zinc	0.23

LINCOLN PARK AMUSEMENT COMPANY

LOCATION:	Route 6 North Dartmouth, Massachusetts
RECEIVING WATER:	East Branch of the Westport River
CAPACITY:	0.05 MGD
TREATMENT PROCESS:	Clarifier Imhoff tank Trickling filter Floculation tank Sand filters Aeration lagoon Chlorination
SLUDGE DISPOSAL:	Landfilled at municipal site.
TYPE OF SAMPLE:	A single grab sample of the effluent A grab sample after chlorination for coliform bacteria

LINCOLN PARK AMUSEMENT COMPANY

RESULTS OF LABORATORY ANALYSES (mg/l)

1979

PARAMETER	EFFLUENT 8/28
BOD_5	32
pH (Standard Units)	7.2
Suspended Solids	12
Total Solids	380
Total Kjeldahl-Nitrogen	10
Ammonia-Nitrogen	6.3
Nitrate-Nitrogen	19
Total Phosphorus	2.9
Total Coliform (#/100 ml)	400
Fecal Coliform (#/100 ml)	<5
Flow (MGD)	0.05

MASSACHUSETTS MARITIME ACADEMY

LOCATION:	Academy Road, Taylors Point Bourne, Massachusetts
RECEIVING WATER:	Cape Cod Canal
CAPACITY:	0.125 MGD
TREATMENT PROCESS:	Extended aeration Chlorination
SLUDGE DISPOSAL:	Removed by contractor and landfilled at municipal site
TYPE OF SAMPLE:	A single grab sample of the effluent A grab sample after chlorination for coliform bacteria

MASSACHUSETTS MARITIME ACADEMY

RESULTS OF LABORATORY ANALYSES (mg/l)

	EFFLUENT	
PARAMETER	10/26/78	8/27/79
COD	110	--
BOD_5	35	4.5
pH (Standard Units)	7.5	6.3
Suspended Solids	82	21
Total Solids	310	312
Settleable Solids (ml/l)	0.1	0.2
Total Alkalinity	211	10
Total Kjeldahl-Nitrogen	59	2.3
Ammonia-Nitrogen	43	0.04
Nitrate-Nitrogen	3.8	25
Total Phosphorus	5.4	6.0
Total Coliform (#/100 ml)	--	<36
Fecal Coliform (#/100 ml)	--	<36
Flow (MGD)	--	0.125

OLD ROCHESTER HIGH SCHOOL

LOCATION:	Marion Road Mattapoisett, Massachusetts
RECEIVING WATER:	Tributary to Mattapoisett Harbor
CAPACITY:	0.012 MGD
TREATMENT PROCESS:	Extended aeration
TYPE OF SAMPLE:	Grab sample of the effluent

OLD ROCHESTER HIGH SCHOOL

RESULTS OF LABORATORY ANALYSES (mg/1)

PARAMETER	EFFLUENT 10/25/78
COD	100
BOD_5	10
pH (Standard Units)	7.1
Suspended Solids	57
Total Solids	312
Settleable Solids (ml/1)	0.3
Total Alkalinity	49
Total Kjeldahl-Nitrogen	16
Ammonia-Nitrogen	8.8
Nitrate-Nitrogen	5.7
Total Phosphorus	2.2

REVERE COPPER AND BRASS

LOCATION:	24 North Front Street New Bedford, Massachusetts
RECEIVING WATER:	Acushnet River
CAPACITY:	Varies with flow
TREATMENT PROCESS:	Oil separator Metals precipitation
TYPE OF SAMPLE:	Grab samples taken from each of the three discharges, 002, 002A, and 004B

REVERE COPPER AND BRASS

RESULTS OF LABORATORY ANALYSES (mg/l)

	EFFLUENT 10/23/78		EFFLUENT 8/28/79		
PARAMETER	002	002A	002	002A	004B
pH (Standard Units)	--	--	7.1	1.2	7.0
Suspended Solids	--	--	0.5	--	11
Total Solids	--	--	386	--	308
Settleable Solids (ml/l)	--	--	--	--	0.05
Total Phosphorus	--	--	0.40	--	0.30
Oil and Grease	--	--	--	1.8	6.4
Chromium, Total	--	--	0.00	0.00	--
Chromium, Hexavalent	--	--	0.000	0.000	--
Copper	0.10	0.12	0.24	0.15	--
Zinc	0.05	0.00	0.10	0.01	--
Flow (MGD)	--	--	0.145	0.023	0.032

GLOSSARY OF TERMS

Acidity - The quantitative capacity of aqueous solutions to react with hydroxyl ions. It is measured by titration with a standard solution of a base to a specified end point. Usually expressed as milligrams per liter of calcium carbonate.

Alkalinity - The capacity of water to neutralize acids, a property imparted by the water's content of carbonates, bicarbonates, hydroxides, and occasionally borates, silicates, and phosphates. It is expressed in milligrams per liter of equivalent calcium carbonate.

Anaerobic Waste Treatment - Waste stabilization brought about through the action of microorganisms in the absence of air or elemental oxygen. Usually refers to waste treatment by methane fermentation.

Biochemical Oxygen Demand (BOD) - The quantity of oxygen used in the biochemical oxidation of organic matter in a specified time, at a specified temperature, and under specified conditions.

Biological Wastewater Treatment - Forms of wastewater treatment in which bacterial or biochemical action is intensified to stabilize, oxidize, and nitrify the unstable organic matter present. Intermittent sand filters, contact beds, trickling filters, and activated sludge processes are examples.

Chemical Oxygen Demand (COD) - A measure of the oxygen-consuming capacity of inorganic and organic matter present in water or wastewater. It is expressed as the amount of oxygen consumed from a chemical oxidant in a specific test. It does not differentiate between stable and unstable organic matter and thus does not necessarily correlate with biochemical oxygen demand.

Chlorination - The application of chlorine to water or wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results.

Clarification - Any process or combination of processes, the primary purpose of which is to reduce the concentration of suspended matter in a liquid.

Coliform - Bacteria found in abundance in the intestinal tract of warm-blooded animals. They are not harmful in themselves, but their presence indicates that pathogenic bacteria may be present. Since they can be detected by relatively simple test procedures, coliforms are used to indicate the extent of bacterial pollution from sewage. Bacterial tests usually measure the fecal and total coliforms. Fecal coliform make up about 90 percent of the coliforms discharged in fecal matter. Non-fecal coliforms may originate in soil, grain, or decaying vegetation.

Comminution - The process of cutting and screening solids contained in the wastewater flow before it enters the flow pumps or other units in the treatment plant.

Composite Wastewater Sample - A combination of individual samples of water or wastewater taken at selected intervals, generally hourly, for some specified period, to minimize the effect of the variability of the individual sample. Individual samples may have equal volume or be proportioned to the flow at the time of sampling.

Data - Records of observations and measurements of physical facts, occurrences, and conditions, reduced to written, graphical, or tabular form.

Fats (wastes) - Triglyceride esters of fatty acids; erroneously used as synonomous with grease.

Flocculation - In water and wastewater treatment, the agglomeration of colloidal and finely divided suspended matter after coagulation by gentle stirring by either mechanical or hydraulic means. In biological wastewater treatment where coagulation is not used, agglomeration may be accomplished biologically.

Grab Sample - A single sample of wastewater taken at neither set time nor flow.

Grease - In wastewater, a group of substances including fats, waxes, free fatty acids, calcium and magnesium soaps, mineral oils, and certain other nonfatty materials. The type of solvent and method used for extraction should be stated for quantification.

Grit Chamber - A detention chamber or enlargement of a sewer designed to reduce the velocity of flow of the liquid to permit the separation of mineral from organic solids by differential sedimentation.

Hardness - A characteristic of water imparted by salts of calcium, magnesium, and iron such as bicarbonates, carbonates, sulfates, chlorides, and nitrates, that cause curdling of soap, deposition of scale in boilers, damage in some industrial processes, and sometimes objectionable taste. It is expressed as equivalent calcium carbonate.

Heavy Metals - These elements are toxic when present in sufficient quantities and can be fatal. They can adversely affect sewage treatment systems and the biological systems of waterbodies. They include cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc.

Industrial Wastes - The liquid wastes from industrial processes, as distinct from domestic or sanitary wastes.

Inorganic Matter - Chemical substances of mineral origin, or, more correctly, not of basically carbon structure.

Lagoon - A pond containing raw or partially treated wastewater in which aerobic or anaerobic stabilization occurs.

Most Probable Number (MPN) - That number of organisms per unit volume that, in accordance with statistical theory, would be more likely than any other number to yield the observed test result with the greatest frequency. Expressed as density of organisms per 100 ml. Results are computed from the number of positive findings of coliform-group organisms resulting from multiple-portion decimal-dilution plantings.

Nitrogen - A common non-metallic element that in free form is normally a colorless, odorless, tasteless, insoluble, inert, diatomic gas. In the combined form, it has a wide range of valences and is a constituent of biologically important compounds (as proteins) and hence of all living cells as well as industrially important substances (as cyanides, fertilizers, dyes).

Nitrogen, Ammonia - A compound of nitrogen and hydrogen, NH_3, which is part of the nitrogen cycle. Its presence in sufficient amounts in a stream can indicate a wastewater discharge. The oxidation of ammonia depletes a stream of dissolved oxygen. It is toxic in sufficient amounts, especially to fish.

Nitrogen, Kjeldahl - This represents the total organic nitrogen content of water.

Nitrogen, Nitrate - Nitrate represents the most highly oxidized phase in the nitrogen cycle and normally reaches important concentrations in the final stages of biological oxidation. Nitrogen in this form is readily available to plants.

Organic Matter - Chemical substances of animal or vegetable origin, or more correctly, of basically carbon structure, comprising compounds consisting of hydrocarbons and their derivatives.

Oxidation - The addition of oxygen to a compound. More generally, any reaction which involves the loss of electrons from an atom.

Oxidation Pond - A basin used for the retention of wastewater before final disposal, in which biological oxidation of organic matter is affected by natural or artificially accelerated transfer of oxygen to the water from air.

Parshall Flume - A calibrated device developed by Parshall for measuring the flow of a liquid in an open conduit.

Pathogenic Bacteria - Bacteria that may cause disease in the host organism by their parasitic growth.

pH - The reciprocal of the logarithm of the hydrogen ion concentration. The concentration is the weight of hydrogen ions in grams per liter of solution. Neutral water, for example, has a pH value of 7 and hydrogen ion concentration of 10^{-7}.

Phenol - An aromatic compound which is a monohydroxy derivative of benzene. In concentrated solution, it is quite toxic to bacteria. Widely used as a germicide. Commonly known as carbolic acid.

Phosphorus - A nonmetallic multivalent element of the nitrogen family that occurs widely in combined form, especially as inorganic phosphates in minerals, soils, and natural waters, and as organic phosphates in all living cells; it exists in several allotropic forms. The majority of

the phosphorus contained in domestic sewage and industrial wastes comes from detergents.

Primary Settling Tank - The first settling tank for the removal of settleable solids through which wastewater is passed in a treatment works.

Primary Treatment - The first major (sometimes the only) treatment in a wastewater treatment works, usually sedimentation. The removal of a substantial amount of suspended matter but little or no colloidal and dissolved matter.

Residual Chlorine - Chlorine remaining in water or wastewater at the end of a specified contact time as combined or free chlorine.

Sampler - A device used with or without flow measurement to obtain an aliquot portion of water or waste for analytical purposes. May be designed for taking a single sample (grab), composite sample, continuous sample, or periodic sample.

Secondary Settling Tank - A tank through which effluent from some prior treatment process flows for the purpose of removing settleable solids.

Secondary Wastewater Treatment - The treatment of wastewater by biological methods after primary treatment by sedimentation.

Sludge Digestion - The process by which organic or volatile matter in sludge is gasified, liquified, mineralized, or converted into more stable organic matter through the activities of either anaerobic or aerobic organisms.

Sludge Thickening - The increase in solids concentration of sludge in a sedimentation or digestion tank.

Solids, Settleable - That matter in wastewater which will not stay in suspension during a pre-selected settling period, such as an hour, but which either settles to the bottom or to the top. In the Imhoff cone test, the volume of matter that settles to the bottom in one hour.

Solids, Suspended - Solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids and which are largely removable by laboratory filtering. The quantity of material removed from wastewater in a laboratory test, as prescribed in Standard Methods for the Examination of Water and Wastewater, and referred to as non-filterable residue.

Solids, Total - The sum of dissolved and undissolved constitutents in water or wastewater, usually stated in milligrams per liter.

Wastewater Survey - An investigation of the quality and characteristics of each waste stream, as in an industrial plant or municipality.