RIVER BASIN WATER QUALITY

STATUS REPORT

Kodiak Basin

ENVIRONMENTAL PROTECTION AGENCY

SURVEILLANCE AND ANALYSIS DIVISION REGION X SEATTLE WASHINGTON

1975

PROFILE SUMMARY

FORWARD

This basin status report is one of 27 scheduled for completion in Region X of EPA for the calendar year 1975. The information presented herein is based upon all of the documented data available to EPA at the time of the report distribution.

Several of these reports include a minimal amount of information which may not be enough to adequately evaluate the water quality status of the basin. We feel that it is important to distribute these reports regardless of the availability of data since the knowledge of a lack of data is also important to the decision makers.

A report update is scheduled annually, therefore, additional data made available in 1975 will be included in the next report.

We welcome comments on this report as well as information concerning additional data and/or sources where additional data might be obtained. Any correspondence can be addressed to Bill Schmidt, Chief, Water Quality Monitoring Section, 1200 Sixth Avenue, Seattle, Washington, 98101. Telephone (206)(442-1193).

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INTRODUCTION

Data on the Kodiak Basin of Alaska, perhaps because of its remote location, is rather limited. Studies of water quality in the area are further hampered by the unusual dual nature of the area. Both ambient freshwater conditions and marine conditions plus their causes must be considered.

This report attempts to address these problems. The first part of the report deals with ambient data from the two existing freshwater stations for which there is adequate information. Table 1 in the Ambient Section shows the lack of ambient data in the Kodiak Basin for the existing water quality stations. The second part of the report presents cause and effect studies of marine waters. This portion of the report is based entirely on two Environmental Protection Agency surveys performed in 1971 and 1974.

SUMMARY & CONCLUSIONS

Basin No. 9 - Kodiak Alaska

At the time of the August 1971 Environmental Protection Agency's survey the state waste discharge permitting agency had not issued a permit to any of the Kodiak seafood processors. The only constraints on the waste waters from the Kodiak seafood processors up to 1972 were those under state regulations requiring grinding of wasted seafood animal parts and disposal of waste waters at a depth not less than 7 fathoms (42 ft.). Therefore, none of the 15 processors located in the Gibson Cove-Kodiak Harbor area were providing any treatment of their waste waters for removal of any pollutants, and only a few occasionally ground the wasted animal parts.

In 1973 the Environmental Protection Agency issued permits to each of these processors; these permits have required screening of processing waste waters with the option of meeting an effluent limitation of 2 milligrams solids per liter of sample. The processors have elected to meet the screening requirement of the permits which expired on May 31, 1975.

The following points illustrate the changes in water quality that have taken place between 1971 and 1974 in relation to seafood processing effluents in the Gibson Cove-Kodiak Harbor area, and also conditions existing in the freshwater stations.

FRESHWATER

1. Myrtle Creek near Kodiak

    a. Nitrate values exceed the Algal Bloom Potential Level for the months of March, April, and September.
    pg. 26

2. Uganik River near Kodiak

    a. Nitrate values for March, April, and September exceed the Algal Bloom Potential Level.
    pg. 32

MARINE WATER

1. Gibson Cove

    a. As in the August 1974 survey, all determinations for Dissolved Oxygen at the mouth of Gibson Cove,

SUMMARY & CONCLUSIONS

Basin No. 9 - Kodiak Alaska

MARINE WATER

1. Gibson Cove (cont)

a. Station 1, were above the 6.0 mg/l standards criterion. However, it should be noted that even though the Dissolved Oxygen concentrations were above the 6.0 mg/l criterion at Station 1 during both the August 1971 and August 1974 surveys, the Dissolved Oxygen was decidely lower in 1974 than 1971, due to the expansion of New England Fish Company and the establishment of Bio-Dry, Inc.
pg. 40-41

b. Dissolved Oxygen values at Station 1A in the top 1 meter of the water column occasionally fall below the 6.0 mg/l standard due to discharges from New England Fish Company. Station 1A was not established at the time of the 1971 survey.
pg.40

c. Dissolved Oxygen concentrations exceed the 6.0 mg/l standards criterion in the top 1 meter at Station 1B. But a D.O. value less than 6.0 mg/l exists in the bottom water column in the vicinity of Bio-Dry, Inc.
pg.40

d. pH values below the standards criterion range, 7.5 to 8.5 mg/l, occur at Station 1A (New England Fish Company).
pg. 39

2. Kodiak Harbor

a. Dissolved Oxygen concentrations at Station 2, King Crab, far exceeded the standards criterion in 1971, but fell below this criterion in both the surface and bottom layers in 1974.
pg. 40-41

b. Dissolved Oxygen values violated the standards criterion in the top 1 meter during both the

SUMMARY & CONCLUSIONS

Basin No. 9 - Kodiak Alaska

2. Kodiak Harbor (cont)

b. 1971 and 1974 surveys at Station 2A, Alaska Pacific Foods. The bottom values exceeded 6.0 mg/1 for both years, but was decidely lower than 1971.
pg. 40-41

c. Dissolved Oxygen concentrations in the top 1 meter of Station 3, B & B Fisheries, have improved to the point where they do exceed the standards criterion, but the level of water quality at depth has declined since 1971.
pg. 40-41

d. Dissolved Oxygen values have shown an improvement in the top 1 meter of the water column at Station 4, Kinnear & Wendt, from a low of 1.3 mg/1 in 1971 to 4.5 mg/1 in 1974 although they still violate the standards criterion. D.O. concentrations exceed the 6.0 mg/1 criterion at depth for the 1974 survey whereas this was violated in 1971.
pg. 40-41

e. Skookum Chief (Northern Processors) shows the most marked improvement over time. At the time of the 1971 survey Station 5 had a low Dissolved Oxygen value of 1.3 mg/1 in the top 1 meter. In comparison, the 1974 survey showed a low of 6.2 mg/1,with all values exceeding the standards criterion.
pg. 40-41

f. In the Kodiak Harbor reaches from Stations 7 to 9, Dissolved Oxygen concentrations less than 6.0 mg/1 were not found during either the August 1971 or August 1974 surveys. Although a decrease in Dissolved Oxygen in these waters is apparent.
pg. 40-41

g. pH values at Station 2A fall below the standards criterion range 7.5 to 8.5 mg/1. for 1974.
pg. 39

SUMMARY & CONCLUSIONS

Basin No. 9 - Kodiak Alaska

2. Kodiak Harbor (cont)

h. pH values above the standards criterion range, 7.5 to 8.5 mg/1 occur at Stations 5 and 6 for 1974.
pg. 39

Further inspection of data at Stations 2 through 6 indicate that the lowest Dissolved Oxygen concentrations found during the 1974 survey (4.5 mg/1) are higher than those measured during the 1971 survey (1.3 mg/1). Comparison of the average Dissolved Oxygen values less than 6.0 mg/1 for the August 1974 survey with those for the August 1971 data reveal that the former values are higher than the latter, 5.2 mg/1 and 4.1 mg/1, respectively. Thus it is concluded that the installation and operation of screening equipment for solids removal at the canneries in this reach of Kodiak Harbor has resulted in a perceptible improvement in the Dissolved Oxygen concentrations in the associated water course. However, the improvement is incomplete in terms of the Alaska Water Quality Standards criterion for this parameter because Dissolved Oxygen concentrations less than the 6.0 mg/1 standards criterion were still apparent, most notably in the top 1 meter, during the August 1974 survey.

POINT SOURCE SUMMARY

Industrial waste sources contribute between 90 and 100% of BOD_5, Phosphorous, COD, Suspended Solids, and Settleable Solids to the Kodiak Basin. Municipal sources contribute the majority of the Nitrate Nitrogen (approximately 92%).

BOTTOM DEPOSIT SUMMARY

Chemical data for 1971 and 1974 reveal that no major changes have occurred in the bottom deposits of Gibson Cove and Kodiak Harbor. Breaks in discharge lines have hampered improvement in water quality in the cove.

General improvements in the biological aspects of the bottom deposits were noted during the 1974 survey. It is evident that installation of screens in process wastewater lines since 1971 has resulted in improved water quality in the bottom reaches of Kodiak Harbor.

DATA SUMMARY

BASIN NO.9 KODIAK ALASKA

	Data Needs						Data Available*	Data Deficient
	W.Q. Trends	Waste Load Alloc.	Modeling	W.Q. Standards				
Physical								
1. Receiving Water		X	X				P	X
2. Reservoirs		X	X					X
3. Outfall Information		X	X				P	X
4. Tributaries & Diversions		X	X				P	X
5. Groundwater Accretions		X						X
Meteorological		X	X				P	
Water Quantity								
1. Steamflow	X	X	X				P	
2. Stage, Tide	X	X	X				P	
3. Point Source Discharge	X	X	X	X				X
4. Non-Point Source Discharge	X	X	X	X				X
5. Lake & Res. Water Levels	X	X	X	X				X
Water Quality								
1. Carbon data	X	X	X	X			P	
2. Nutrients	X	X	X	X			P	
3. Metals	X	X	X				P	
4. D.O., Temp., pH, Cond.	X	X	X	X			P	
5. Pesticides	X	X	X					X
6. Transfer Ratio		X	X	X				X
Biological								
1. Phytoplankton & Zooplankton	X	X					P	
2. Benthic Macroinvertebrates	X	X						X
3. Microorganisms	X	X	X	X				X
4. Algal & bio assays	X	X	X	X				X
Sediments								
1. Chemical Composition	X	X	X	X			P	
2. Partical Size							X	
3. Pesticides	X	X	X					X
4. Transfer Ratio		X	X	X				X

*P-PARTIAL DATA AVAILABLE

BASIN DESCRIPTION

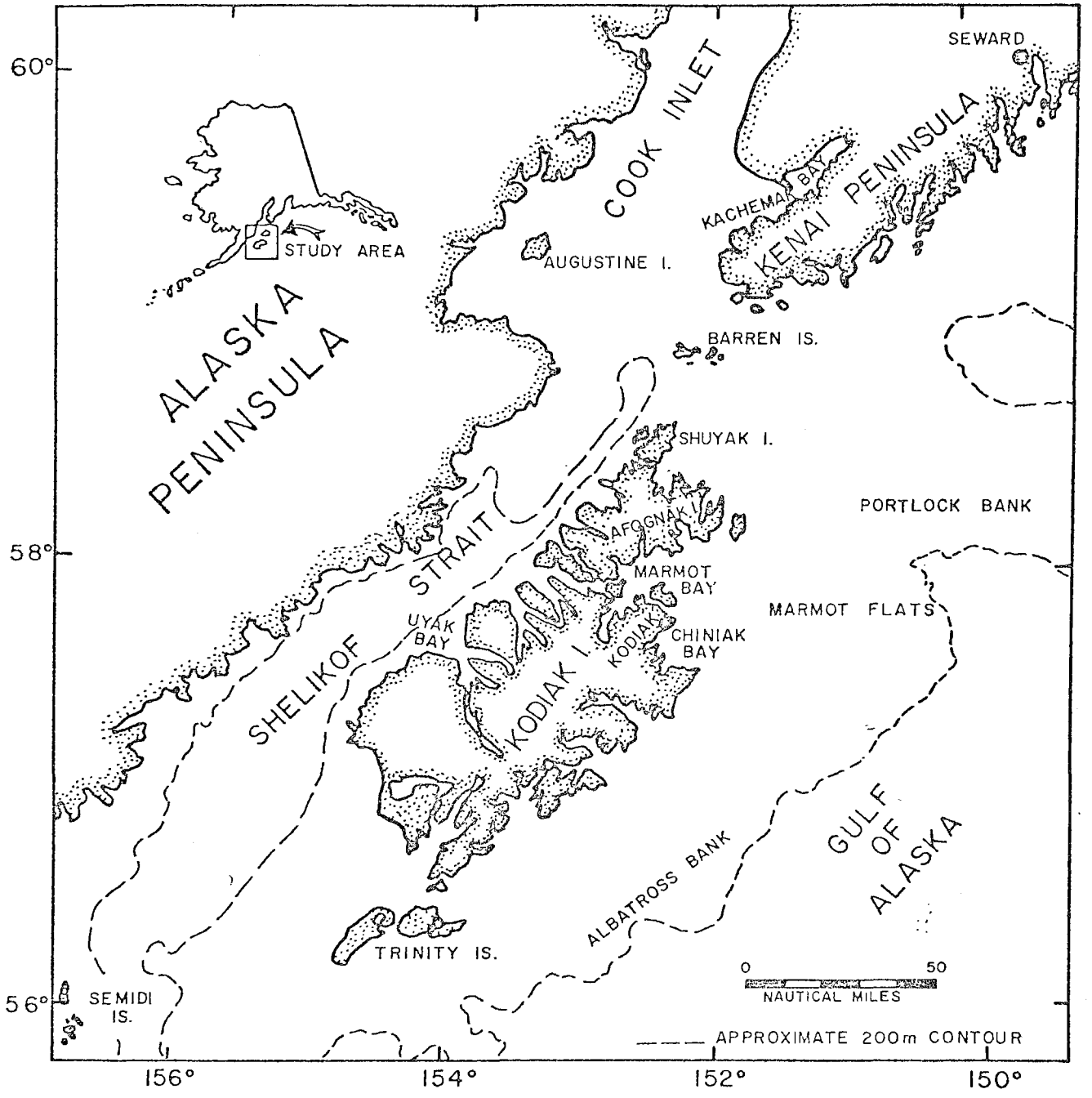


Figure 1. Kodiak Island region, Alaska.

BASIN DESCRIPTION

Introduction

Kodiak Island lies in the middle of Alaska's Pacific coastline at the center of one of the world's most important fisheries. Significant quantities of salmon and halibut, as well as King, Tanner and Dungeness Crab are taken from the waters around Kodiak. Over $18 million worth of this catch makes Kodiak the nation's second largest fishing port.

The climate in the Kodiak area is typical high latitude maritime, characterized by high precipitation and relatively mild temperatures. Mean seasonal temperature variation is only about 12°F, around a mean annual temperature of approximately 40°F. Average precipitation is approximately 60 inches, of which 10% falls as snow. Local weather patterns are dominated by the oceanic influence of the warm Alaska current, a branch of the Kuroshio system which flows in a counter-clockwise gyre in the Gulf of Alaska. The interaction of this warm ocean water and its associated winds with the cold glacial waters of the Alaskan coast can produce short, violent storms in any season.

Kodiak Harbor & Gibson Cove

The city of Kodiak has the greatest concentration of seafood processing plants in the state, where 15 seafood processing establishments discharge wastes to the marine waters of Gibson Cove and Kodiak Harbor (Figure 2). The 14 seafood processing plants operating in the Kodiak Harbor area, located on the waterfront of the city of Kodiak, processed 110 million pounds of fishery products in 1971. Based on the records of these 14 plants, an estimated 72 million pounds of wastes from these facilities were discharged without treatment to Kodiak Harbor.

Other than the wastewater discharges from a few municipal sewers and the seafood processors, there are no major sources of non-saline water in the Gibson Cove-Kodiak Harbor area. Thus, the waters of this area are decidely marine rather than estuarine. Gibson Cove is a small bean-shaped embayment protruding inland from St. Paul Harbor which provides ready access to the open ocean waters of Chiniak Bay. The cove is only about 600 yards long and 225 yards wide with a 90 yard wide connection to St. Paul Harbor, and with a maximum depth of only 5 fathoms. Currently there is only one seafood processing facility located in the cove, but plans are being made to locate two more here.

Kodiak Harbor, located northeasterly of Gibson Cove about one-half mile, is a narrow channel formed by Gull, Uski, and Near Islands. The harbor is 1.76 miles long and varies in width from 600 yards on its westerly end to about 110 yards near the easterly end; it has a maximum depth of 13 fathoms. Fourteen seafood processing facilities are located on the north shore of Kodiak Harbor, and more than half of the 14 are concentrated along a 2100 yard length of the waterfront.

Physical Oceanography

The Kodiak Shelf is made up of two distinct water types, one oceanic and one coastal type. The inshore waters, as seen in Shelikof Strait, tend to be relatively cold and of low salinity, while the offshore Gulf of Alaska waters have both higher temperatures and salinities. Typical values for the inshore water type would be a salinity of 30-37%, and temperatures ranging 4-7°C; the offshore waters are characterized by salinities greater than 32% and temperatures ranging up to 10°C. In the entire Kodiak Shelf region oxygen concentrations are close to saturation values in all the shallower waters, a result of rapid mixing and high local organic productivity.

Shelikof Strait

Shelikof Strait, which separates Kodiak Island from the mainland, is the principal connection between Cook Inlet and the ocean (Figure 1). Outflowing relatively fresh waters dominate the mainland side of the Straits, with a corresponding upwelling of deeper oceanic waters to the East. This effect is due to coriolis deflection of the water currents. A halocline exists at both the north and south ends of the strait, and a thermocline is present in parts of the Strait, but salinity seems to be the parameter controlling the water structure.

Previous Studies

Several studies have been conducted in the waters around Kodiak Island. A preliminary oceanographic study was conducted by the University of Alaska in June of 1967. The results of this cruise were held in anticipation of more comprehensive cruises in the area, which as of yet has not been possible. The Alaska Operations Office of the Environmental Protection Agency conducted a study during May of 1971 to determine the effects of discharge of untreated seafood wastes on water quality in St. Paul Harbor and Gibson Cove. The results of this study showed that each of the seafood processing plants has contributed untreated wastewater discharges which violated the Alaska Water Quality Standards.

Further study by the Alaska Operations Office took place in August 1974. This survey was undertaken to determine the present quality of the waste receiving waters and to determine the improvements, if any, that have occured in water quality as a result of installation of screening systems by the seafood processors.

WATER QUALITY STANDARDS

The present Alaska Water Quality Standards (4) designate the marine waters of the state, including Gibson Cove and Kodiak Harbor as Class C, D, E, and G. Beneficial uses of marine waters include water contact recreation, industrial water supply, growth and propagation of aquatic life and waterfowl, fur-bearers and other water-associated life. The standards criteria associated with marine waters that are of particular interest in this report are those for dissolved oxygen, residues in the form of floating solids and sludge deposits, and toxic substances. Of the various classifications, Class D and E have the most stringent criteria:

Dissolved Oxygen

Class D - greater than 6 mg/l in salt water

Class E - greater than 6 mg/l in the larvae stage. Greater than 5 mg/l in the adult stage.

Residues

Class D - residues may not make the receiving water unfit or unsafe for the uses of this classification; nor cause a film or sheen upon, or discoloration of, the surface of the water or adjoining shoreline; nor cause a sludge or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom or upon adjoining shorelines.

Residues shall be less than those levels which cause tainting problems as determined by bioassay.

Class E - same as Class D.

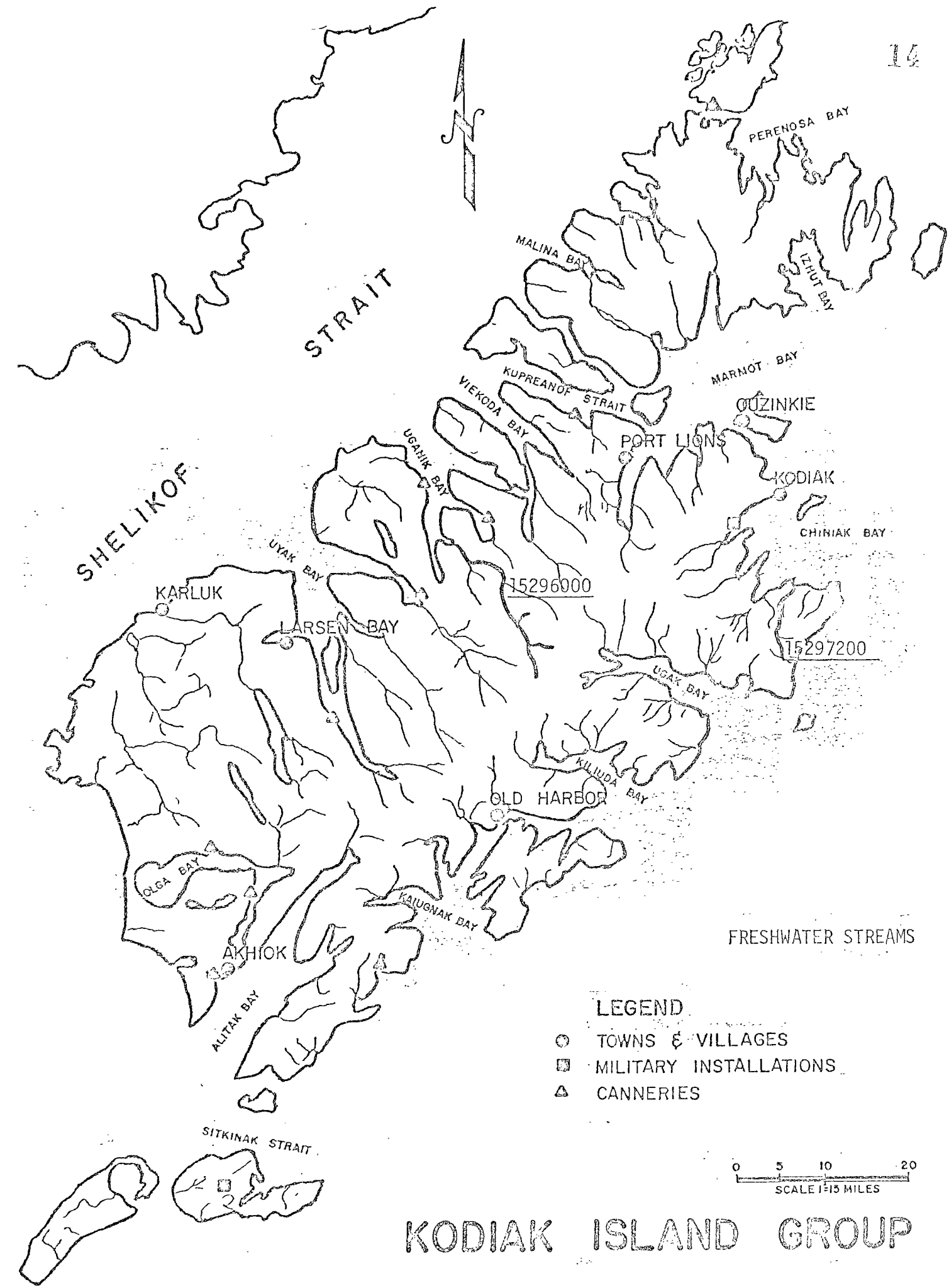
Toxic Substances

Class D - Concentrations shall be less than those levels which cause tainting of fish, less than acute or chronic problem levels as revealed by bioassay or other appropriate methods and below concentrations affecting the ecological balance.

Class E - same as Class D.

AMBIENT PROFILE

AMBIENT PROFILE TABLE OF CONTENTS



KODIAK ISLAND GROUP

TABLE 1

STATION NAME / RIVER MILES / STORET # / AGENCY #	DATE	SUMMARY	00010 WATER TEMP CENT	00060 STREAM FLOW CFS	00080 COLOR PT-CO UNITS	00400 PH SU	71850 NITRATE TOT-NO3 MG/L	00405 CO2 MG/L	00410 T ALK CACO3 MG/L	00900 TOT HARD CACO3 MG/L	00915 CALCIUM CA,DISS MG/L	00925 MGNSIUM MG,DISS MG/L
MONASHKA CREEK NEAR KODIAK												
0.0 / 0.0 / 0.0	68/08/07			15.0	0	7.6	0.40	1.2	24.0	27	9.5	0.9
#15297470 112WRD	72/10/05	0830	6.0	25.0	10	6.9			19.0	24	8.2	0.9
	73/01/22	1200		3.8								
	STATION MEAN		6.0	14.6	5	7.2	0.40	1.2	21.5	26	8.8	0.9
RED CLOUD CREEK TRIB NEAR KODIAK												
0.0 / 0.0 / 0.0	71/07/21	2000	7.0			7.0	0.00		6.6	6		
#15297500 112WRD	STATION MEAN		7.0			7.0	0.00		6.6	6		

STATION NAME / RIVER MILES / STORET # / AGENCY #	DATE	SUMMARY	00930 SODIUM NA,DISS MG/L	00935 PTSSIUM K,DISS MG/L	00940 CHLORIDE CL MG/L	00945 SULFATE SO4-TOT MG/L	00950 FLUORIDE F,DISS MG/L	00955 SILICA DISSOLVED MG/L	70301 DISS SOL SUM MG/L	70302 DISS SOL TONS/DAY	80154 SUSP SED CONC MG/L	80155 SUSP SED DISCHARG TONS/DAY
MONASHKA CREEK NEAR KODIAK												
0.0 / 0.0 / 0.0	68/08/07		3.60	0.20	4.4	6	0.10	5.4	45	1.82		
#15297470 112WRD	72/10/05	0830	4.10	0.40	6.2	5	0.00	7.9	45	3.04		0.13
	73/01/22	1200										0.03
	STATION MEAN		3.85	0.30	5.3	6	0.05	6.6	45	2.43		0.08
RED CLOUD CREEK TRIB NEAR KODIAK												
0.0 / 0.0 / 0.0	71/07/21	2000	1.80	0.30	2.5		0.00	3.0				
#15297500 112WRD	STATION MEAN		1.80	0.30	2.5		0.00	3.0				

STATION NAME / RIVER MILES / STORET # AGENCY # DATE SUMMARY	00010 WATER TEMP CENT	00060 STREAM FLOW CFS	080 COLOR PT-CO UNITS	00400 PH SU	71850 NITRATE TOT-NO3 MG/L	00405 CO2 MG/L	00410 T ALK CACO3 MG/L	00900 TOT HARD CACO3 MG/L	00915 CALCIUM CA,DISS MG/L	00925 MAGNSIUM MG,DISS MG/L
L KITOI C NR AFOGNAK AK										
0.0 / 0.0 / 0.0 60/12/14		17.0	20	7.3	0.20		27.0	31	9.1	2.1
#15295500 112WRD 61/04/21		3.3	10	6.9	0.20		28.0	32	9.5	2.1
STATION MEAN		10.1	15	7.1	0.20		27.5	32	9.3	2.1
TERROR RIVER NR KODIAK										
0.0 / 0.0 / 0.0 68/08/07 1020	14.0	101.0	5	6.9	0.00		6.0	7	2.5	0.2
#15295600 112WRD STATION MEAN	14.0	101.0	5	6.9	0.00		6.0	7	2.5	0.2
TERROR RIVER AT MOUTH NEAR KODIA										
0.0 / 0.0 / 0.0 68/06/18 1445		542.0								
#15295700 112WRD 68/06/18 1630		542.0	0	6.5	0.00		7.0	7	2.5	0.2
68/08/07 1230	14.0	199.0				1.3	5.0			
STATION MEAN	14.0	427.7	0	6.5	0.00	1.3	6.0	7	2.5	0.2
UNNAMED CREEK NORTH OF OLD HARBO										
0.0 / 0.0 / 0.0 70/06/23 1640	7.5	13.0	0	7.2	0.80		8.0	10	3.2	0.5
#15297060 112WRD STATION MEAN	7.5	13.0	0	7.2	0.80		8.0	10	3.2	0.5
UNNAMED CREEK NR OLD HARBOR, KOD										
0.0 / 0.0 / 0.0 70/06/23 1330	7.0	7.4	0	7.1	0.40		8.0	10	3.2	0.5
#15297050 112WRD STATION MEAN	7.0	7.4	0	7.1	0.40		8.0	10	3.2	0.5
DOG SALMON C NR AYAKULIK AK										
0.0 / 0.0 / 0.0 59/12/10		270.0	0	7.4	0.40		14.0	134	4.0	1.7
#15297000 112WRD 60/06/01		478.0	0	6.9	0.10		15.0	19	4.4	1.9
STATION MEAN		374.0	0	7.1	0.25		14.5	77	4.2	1.8

STATION NAME / RIVER MILES / STORET # AGENCY # DATE SUMMARY	00930 SODIUM NA,DISS MG/L	00935 PTSSIUM K,DISS MG/L	00940 CHLORIDE CL MG/L	00945 SULFATE SO4-TOT MG/L	00950 FLUORIDE F,DISS MG/L	00955 SILICA DISSOLVED MG/L	70301 DISS SOL SUM MG/L	70302 DISS SOL TONS/DAY	80154 SUSP SED CONC MG/L	80155 SUSP SED DISCHARG TONS/DAY
L KITOI C NR AFOGNAK AK										
0.0 / 0.0 / 0.0 60/12/14	8.20	0.60		5	0.00	7.2	62	2.85		
#15295500 112WRD 61/04/21	8.40	0.50	12.0	8	0.00	6.9	65	0.58		
STATION MEAN	8.30	0.55	12.0	7	0.00	7.0	64	1.71		
TERROR RIVER NR KODIAK										
0.0 / 0.0 / 0.0 68/08/07 1020	1.20	0.20	1.8	4	0.00	3.1	16	4.36		
#15295600 112WRD STATION MEAN	1.20	0.20	1.8	4	0.00	3.1	16	4.36		
TERROR RIVER AT MOUTH NEAR KODIA									6	8.80
0.0 / 0.0 / 0.0 68/06/18 1445										
#15295700 112WRD 68/06/18 1630	1.60	0.20	1.2	4	0.00	3.3	17	24.90		
68/08/07 1230							16	8.60	7	3.80
STATION MEAN	1.60	0.20	1.2	4	0.00	3.3	17	16.75	7	6.30
UNNAMED CREEK NORTH OF OLD HARBO										
0.0 / 0.0 / 0.0 70/06/23 1640	2.50	0.20	3.2	16	0.00	4.2	21	0.74		
#15297060 112WRD STATION MEAN	2.50	0.20	3.2	16	0.00	4.2	21	0.74		
UNNAMED CREEK NR OLD HARBOR, KOD										
0.0 / 0.0 / 0.0 70/06/23 1330	2.30	0.20	2.1	2	0.10	3.3	19	0.38		
#15297050 112WRD STATION MEAN	2.30	0.20	2.1	2	0.10	3.3	19	0.38		
DOG SALMON C NR AYAKULIK AK										
0.0 / 0.0 / 0.0 59/12/10	18.00	0.60	9.0	2	0.10	6.0	215	157.00		
#15297000 112WRD 60/06/01	5.00	0.50	8.0	5	0.00	6.2	40	51.60		
STATION MEAN.	11.50	0.55	8.5	4	0.05	6.1	128	104.30		

STATION NAME / RIVER MILES / STORET # / AGENCY #	DATE	SUMMARY	00010 WATER TEMP CENT	00060 STREAM FLOW CFS	0008 COLOR PT-CO UNITS	00400 PH SU	71850 NITRATE TOT-NO3 MG/L	00405 CO2 MG/L	00410 T ALK CACO3 MG/L	00900 TOT.HARD CACO3 MG/L	00915 CALCIUM CA,DISS MG/L	00925 MGNSIUM MG,DISS MG/L
MYRTLE CREEK NEAR KODIAK												
0.0 / 0.0 / 0.0	48/10/04	1730					1.10		41.0	43	13.0	2.5
#15297200 112WRD	49/04/19	0930	1.5	14.0					53.0			
	51/04/18		1.0		10	7.9	2.00	0.9	38.0	42	14.0	1.8
	51/05/05		5.5		30	7.2	2.80	4.4	36.0	40	13.0	1.9
	51/05/14	1500			10	7.3	1.80	2.9	30.0	35	11.0	1.8
	51/06/06		8.5		10	7.4	1.00	2.4	30.0	30	9.7	1.4
	51/06/14		8.5		10	7.4	0.80	1.6	21.0	20	5.7	1.3
	51/11/21	1500	0.0		5	7.2	1.00	5.5	44.0	47	15.0	2.4
	52/02/11	1430			5	7.2	1.10	5.2	43.0	50	16.0	2.4
	52/03/12	1400	0.5		5	7.2	1.10	5.6	45.0	51	16.0	2.7
	52/04/18	1800	1.0		5	7.5	1.60	2.7	44.0	51	16.0	2.6
	52/05/07	0900	2.0		15	7.3	1.60	4.3	44.0	52	16.0	3.0
	52/06/12	0800	6.0		5	7.2	0.90	2.8	23.0	27	8.4	1.5
	52/07/16	1100	6.5		5	6.5	0.70	17.0	28.0	30	10.0	1.3
	52/09/13	1200	6.0		5	6.8	1.60	11.0	34.0	36	13.0	1.2
	52/09/29	1300	5.5		5	7.0	0.90	6.9	35.0	42	13.0	2.3
	56/03/29					7.2	0.40	6.3	51.0	49	15.0	2.9
	56/05/12					7.5		2.5	40.0	42	13.0	2.2
	57/02/07					7.2		6.7	54.0	50	16.0	2.5
	61/10/17		0.5	16.0	10	7.5	1.80	2.1	43.0	42	15.0	1.1
	68/06/19	1010		16.0	5	6.7	0.20	3.8	10.0	9	2.7	0.6
	68/07/30	1540	11.0	59.0	5	7.1	0.40	1.3	8.0	8	2.3	0.5
	68/07/31	1110	8.0	230.0	0	7.7	0.30	0.8	21.0	24	8.6	0.8
	68/07/31		9.0	77.0	5	7.4	0.20	1.3	16.0	17	6.3	0.4
	69/01/08	1100	0.0	1.5								
	69/02/18	1030	0.0	1.8	5	7.1	0.80		9.0	12	3.4	0.7
	69/09/16	1200	8.0	58.4	15	7.0	1.60		3.0	8	2.2	0.7
	70/04/15	1210	3.0	42.8								
	70/04/15			43.0	0	6.7	1.40		5.5	7	2.0	0.5
	70/05/17	1700	7.5	48.8								
	70/05/27	1700	7.5	49.0		7.0	0.80			8	2.2	0.6
	70/06/24	1130	7.0	36.7	0	7.0	0.50		6.0	8	2.4	0.5
	70/08/03	1915	10.5	18.0								
	70/10/13	1345	7.0	22.0	0	6.9	1.30		9.0	10	3.0	0.6
	70/10/13	1350	7.0	22.0								
	70/11/10	1250	4.5	186.0								
	70/11/10	1300		186.0		7.2			5.0	11		
	70/11/11	1100	4.5	248.0		7.3			4.0	12		
	71/01/05	1320	1.0	51.0								
	71/01/05		1.0	51.0		7.5			7.0	10		
	71/03/18	1100	0.5	3.8	0	7.1	1.40		7.0	16	4.5	1.0
	71/05/25	1305	0.5	301.0		6.6			6.0	9		
	71/05/25	1310	0.5	301.0								
	71/07/21	1745	6.5	221.0								
	71/09/08	1030	7.0	54.0								
	71/10/14	1330	4.5	24.0								
	72/01/04	1200	0.0	9.9								
	72/02/24	1500	0.5	1.8								
	STATION MEAN		4.3	79.8	7	7.2	1.11	4.5	26.3	28	9.6	1.5

STATION NAME / RIVER MILES / STORET # / AGENCY #	DATE	SUMMARY	00930 SODIUM NA,DISS MG/L	00935 PTSSIUM K,DISS MG/L	00940 CHLORIDE CL MG/L	00945 SULFATE SO4-TOT MG/L	00950 FLUORIDE F,DISS MG/L	00955 SILICA DISSOLVED MG/L	70301 DISS SOL SUM MG/L	70302 DISS SOL TONS/DAY	80154 SUSP SED CONC MG/L	80155 SUSP SED DISCHARG TONS/DAY
MYRTLE CREEK NEAR KODIAK												
0.0 / 0.0 / 0.0	48/10/04	1730			2.0	8	0.00	9.6	66			
#15297200 112WRD	49/04/19	0930			7.0	11						
	51/04/18				3.4	9		6.3	64			
	51/05/05				2.2	5	0.10	7.5	58			
	51/05/14	1500			1.9	3	0.10	6.5	44			
	51/06/06				0.5	4		5.8	44			
	51/06/14				0.2	5	0.00	3.8	32			
	51/11/21	1500			5.2	8	0.20	7.9	73			
	52/02/11	1430			5.5	10	0.30	7.4	74			
	52/03/12	1400			5.8	10	0.10	7.4	77			
	52/04/18	1800			5.0	9	0.00	6.8	72			
	52/05/07	0900			5.5	10	0.10	7.6	76			
	52/06/12	0800			1.8	6	0.10	5.1	41			
	52/07/16	1100			0.8	5	0.00	7.1	43			
	52/09/13	1200	1.80	0.90	0.5	5	0.00	7.5	53			
	52/09/29	1300	2.00	0.80	1.5	7		8.4	57			
	56/03/29		6.10	1.50	0.2	4	0.20	8.4	70			
	56/05/12		4.50	0.60	3.0	5						
	57/02/07				0.4	4						
	61/10/17		4.00	0.30	1.0	4	0.10	7.3	61	2.64		
	68/06/19	1010	3.00	0.20	3.2	3	0.00	5.2	24	1.04	2	0.09
	68/07/30	1540	2.60	0.10	3.0	2	0.10	5.8	22	3.50	5	0.80
	68/07/31	1110	3.10	0.20	4.4	6	0.20	4.3	41	25.50		
	68/07/31		2.00	0.[illegible]	2.3	4	0.00	4.1	30	6.24		
	69/01/08	1100								0.09	1	0.00
	69/02/18	1030	3.80	0.90	5.3	6	0.10	5.8	31	0.15		
	69/09/16	1200	2.90	0.10	3.9	3	0.00	6.0	25	3.94	4	0.63
	70/04/15	1210									1	0.12
	70/04/15		3.30	0.20	5.0	2	0.20	4.2	22	2.55		
	70/05/17	1700									1	0.13
	70/05/27	1700	3.00	0.30	5.7	0	0.10	4.7	21	2.78		
	70/06/24	1130	2.90	0.20	3.5	2	0.10	4.2	20	1.98	1	0.10
	70/08/03	1915								1.12	2	0.10
	70/10/13	1345	3.30	0.30	3.5	4	0.30	5.6	27	1.60		
	70/10/13	1350									1	0.06
	70/11/10	1250									3	1.50
	70/11/11	1100									9	6.00
	71/01/05	1320									1	0.14
	71/03/18	1100	5.20	0.30	11.0	2	0.00	4.7	35	0.36	1	0.01
	71/05/25	1310									94	76.00
	71/07/21	1745									31	18.00
	71/09/08	1030									3	0.44
	71/10/14	1330									1	0.06
	72/01/04	1200									2	0.05
	72/02/24	1500										
	STATION MEAN		3.34	0.44	3.4	5	0.10	6.2	47	3.82	1	0.00
											9	5.49

* RIVER MILES * STORET #	AGENCY #	DATE	SUMMARY	TEMP CENT	FLOW CFS	COLOR PT-CO UNITS	TURBIDITY SU	OXYGEN, DISSOLVED MG/L	MG/L	CHLORIDE MG/L	HARDNESS, NONCARBONATE MG/L	HARDNESS, CA, DISSOLVED MG/L	HARDNESS, CA, DISSOLVED MG/L
SALONIE C NR KODIAK AK													
0.0 / 0.0 / 0.0		68/07/31	1110	8.0	230.0	0	7.7	0.30		21.0	24	8.6	0.8
#15297420	112WRD	STATION MEAN		8.0	230.0	0	7.7	0.30		21.0	24	8.6	0.8
RUSSIAN CREEK NEAR KODIAK													
0.0 / 0.0 / 0.0		68/07/31	1015	9.0	204.0	0	7.4	1.00		20.0	22	8.1	0.6
#15297425	112WRD	68/09/25	1500			10	7.0	0.00		21.0	24	10.0	0.8
		STATION MEAN		9.0	204.0	5	7.2	0.50		20.5	23	9.0	0.7
SARGENT CREEK NR KODIAK													
0.0 / 0.0 / 0.0		68/07/31	0920	9.0	77.0	5	7.4	0.20		16.0	17	6.3	0.4
#15297430	112WRD	STATION MEAN		9.0	77.0	5	7.4	0.20		16.0	17	6.3	0.4
RUSKIN R NR KODIAK AK													
0.0 / 0.0 / 0.0		68/03/26	1030	0.5			7.1	1.10	2.2	14.0	20	8.0	
#15297440	112WRD	68/07/31	1310	12.0	210.0	5	7.2	0.30		15.0	16	5.7	0.6
		68/09/28				5	7.1	0.30		15.0	18	6.1	0.8
		STATION MEAN		6.2	210.0	5	7.1	0.57	2.2	14.7	18	6.6	0.7
DEVILS CREEK NEAR KODIAK													
0.0 / 0.0 / 0.0		68/03/26		0.0	7.9		7.4	1.40		21.0	32	13.0	
#15297441	112WRD	68/07/31	1210	10.0	30.8	5	7.5	0.20		23.0	24	8.7	0.8
		68/10/05	1030			10	7.5	0.80		21.0	26	9.4	1.1
		STATION MEAN		5.0	19.3	8	7.5	0.80		21.7	27	10.4	0.9
ELEPHANT LAKE ON WOODY ISLAND													
0.0 / 0.0 / 0.0		59/11/15				175	6.5	1.00		12.0	20	2.8	3.1
#15297445	112WRD	60/01/15				0	7.7	0.20		29.0	134	4.8	6.1
		STATION MEAN				88	7.1	0.60		20.5	77	3.8	4.6
MIDDLE FORK PILLAR CREEK NEAR KO													
0.0 / 0.0 / 0.0		68/03/26	1130	1.0	7.5		7.3	1.00		14.0	20	8.0	
#15297450	112WRD	68/03/26	1131		7.5								
		68/06/19	1315		9.4	0	6.8	0.00		18.0	18	6.0	0.8
		68/07/31	1700		21.6	5	7.4	0.60		16.0	35	5.6	0.9
		68/10/05				10	7.2	1.10		18.0	22	7.1	1.2
		69/02/18	1420	0.5	1.3	5	7.0	0.40		13.0	16	5.0	1.0
		70/04/16	1430	1.5	8.4	5	6.5	0.70		7.0	14	4.6	0.6
		STATION MEAN		1.0	9.3	5	7.0	0.63		14.3	21	6.0	0.9

* STORET #	AGENCY #	DATE	SUMMARY	00930 SODIUM DISS MG/L	00935 POTASSIUM DISS MG/L	00940 CHLORIDE GL MG/L	00945 SULFATE SO4-TOT MG/L	00950 FLUORIDE F,DISS MG/L	00955 SILICA DISSOLVED MG/L	70301 DISS SOL SUM MG/L	70302 SUSP SED TONS/DAY	80154 SUSP SED DISCHRG MG/L	80155 SUSP SED DISCHRG TONS/DAY
SALONIE C NR KODIAK AK													
0.0 / 0.0 / 0.0		68/07/31	1110	3.10	0.20	4.4	6	0.20	4.3	41	25.50		
#15297420	112WRD	STATION MEAN		3.10	0.20	4.4	6	0.20	4.3	41	25.50		
RUSSIAN CREEK NEAR KODIAK													
0.0 / 0.0 / 0.0		68/07/31	1015	2.30	0.20	3.0	6	0.00	4.3	38	20.90		
#15297425	112WRD	68/09/25	1500	2.50	0.00	1.5	8	0.00	4.0	40			
		STATION MEAN		2.40	0.10	2.2	7	0.00	4.1	39	20.90		
SARGENT CREEK NR KODIAK													
0.0 / 0.0 / 0.0		68/07/31	0920	2.00	0.10	2.3	4	0.00	4.1	30	6.24		
#15297430	112WRD	STATION MEAN		2.00	0.10	2.3	4	0.00	4.1	30	6.24		
RUSKIN R NR KODIAK AK													
0.0 / 0.0 / 0.0		68/03/26	1030	3.60	0.30	6.0	3	0.10	4.7	35			
#15297440	112WRD	68/07/31	1310	2.70	0.20	3.8	3	0.00	4.5	30	17.00		
		68/09/28		3.20	0.30	3.6	3	0.00	4.5	31			
		STATION MEAN		3.17	0.27	4.5	3	0.03	4.6	32	17.00		
DEVILS CREEK NEAR KODIAK													
0.0 / 0.0 / 0.0		68/03/26		4.00	0.50	6.0	3	0.30	5.4	46	0.98		
#15297441	112WRD	68/07/31	1210	3.00	0.10	3.6	5	0.10	5.5	41	3.41		
		68/10/05	1030	3.60	0.20	4.1	8	0.00	5.8	44			
		STATION MEAN		3.53	0.27	4.6	5	0.13	5.6	44	2.19		
ELEPHANT LAKE ON WOODY ISLAND													
0.0 / 0.0 / 0.0		59/11/15		15.00	1.00	26.0	6	0.00	9.3	74			
#15297445	112WRD	60/01/15		44.00	2.80	29.0	7	0.10	11.0	274			
		STATION MEAN		29.50	1.90	27.5	7	0.05	10.1	174			
MIDDLE FORK PILLAR CREEK NEAR KO													
0.0 / 0.0 / 0.0		68/03/26	1130	6.60	0.30	7.4	2	0.20	5.6	37	0.75		
#15297450	112WRD	68/03/26	1131								0.75		
		68/06/19	1315	4.90	0.30	6.6	4	0.00	5.8	39	0.99		
		68/07/31	1700	4.20	0.10	6.0	3	0.00	6.4	37	2.16		
		68/10/05		4.20	0.50	5.4	5	0.00	6.1	39			
		69/02/18	1420	5.80	0.90	8.9	5	0.20	6.4	42	0.15		
		70/04/16	1430	4.80	0.20	8.5	4	0.20	4.2	32	0.73		
		STATION MEAN		4.75	0.38	7.1	4	0.10	5.7	38	0.92		

STATION NAME / RIVER MILES / STORET #	AGENCY #	DATE	SUMMARY	WATER TEMP CENT	FLOW CFS	PT-CO UNITS	SU	TOT-NO3 MG/L	MG/L	CACO3 MG/L	CACO3 MG/L	MG/L	MG/L
UNAMED RIVER NEAR MORTAR													
0.0 / 0.0 / 0.0		51/10/04			249.0	10	6.9	0.70	3.2	13.0	17	5.0	1.1
01524000	112WRD	55/10/04			365.0		6.6	0.00	5.6	11.0	18	6.0	0.7
		56/06/26			1320.0	0	7.1	0.70	2.2	14.0	17	5.6	0.7
		56/10/04	1150	4.5	213.0	5	6.9	0.30	3.2	13.0	17	5.2	0.9
		57/07/18			663.0	10	6.6	0.30	6.8	14.0	16	4.0	1.4
		58/10/30	1205		1920.0	10	6.7	0.60	4.8	12.0	17	4.4	1.4
		58/01/10	1400	0.5	272.0	15	7.5	0.60	0.1	2.0	9	7.6	1.1
		58/03/26	0920	0.0	7.9		7.4	1.40	1.7	21.0	32	13.0	
		58/03/26	1130	1.0	7.5		7.3	1.00	1.4	14.0	20	8.0	
		58/03/27	1450	3.0	129.0		7.3	1.40	1.6	16.0	24	9.6	
		58/03/27	1500		129.0		7.3	1.40		16.0	24	9.6	
		58/05/09	1715	7.0	281.0	20	6.9	0.40	4.8	20.0	23	6.8	1.5
		58/06/18	1230		1540.0	0	6.8	0.00	5.3	17.0	16	5.5	0.8
		58/06/19	1315		9.4	0	6.8	0.00	5.6	18.0	18	6.0	0.8
		58/07/31	1210	10.0	31.0	5	7.5	0.20	1.6	23.0	24	8.7	0.8
		58/07/31	1700		21.0	5	7.4	0.60	1.3	16.0	35	5.6	0.9
		58/08/07	1500	16.0	512.0	0	7.1	0.40	1.8	11.0	14	4.5	0.8
		58/08/07	1501		512.0								
		58/09/10				5	7.0	2.90	4.2	21.0	21	5.4	2.0
		58/09/17	1200	8.0	1160.0	20	7.3	0.20		5.0	14	4.4	0.8
		70/04/14	1145	3.0	247.0								
		70/04/14	1150	3.0	248.0	0	7.1	2.30		17.0	20	6.4	1.0
		70/05/27	1130	6.0	1340.0	0	7.5	2.00			20	6.4	1.0
		70/05/27	1200	6.0	1340.0								
		70/06/25	1200	7.0	2000.0								
		70/06/25	1330		2000.0		7.4						
		70/08/03	1240	8.0	1703.0								
		71/01/06	1130	0.0	276.0								
		71/01/06			276.0	0	7.4	1.50		16.0	19	6.2	0.9
		71/05/26	1250	5.5	760.0		7.2			16.0	20		
		71/07/21	1130	7.0	2460.0								
		71/10/22	1100	5.0	590.0								
		72/04/14	1330	2.0	43.0								
		STATION MEAN		5.0	688.3	6	7.1	0.86	3.2	14.8	20	5.5	1.0

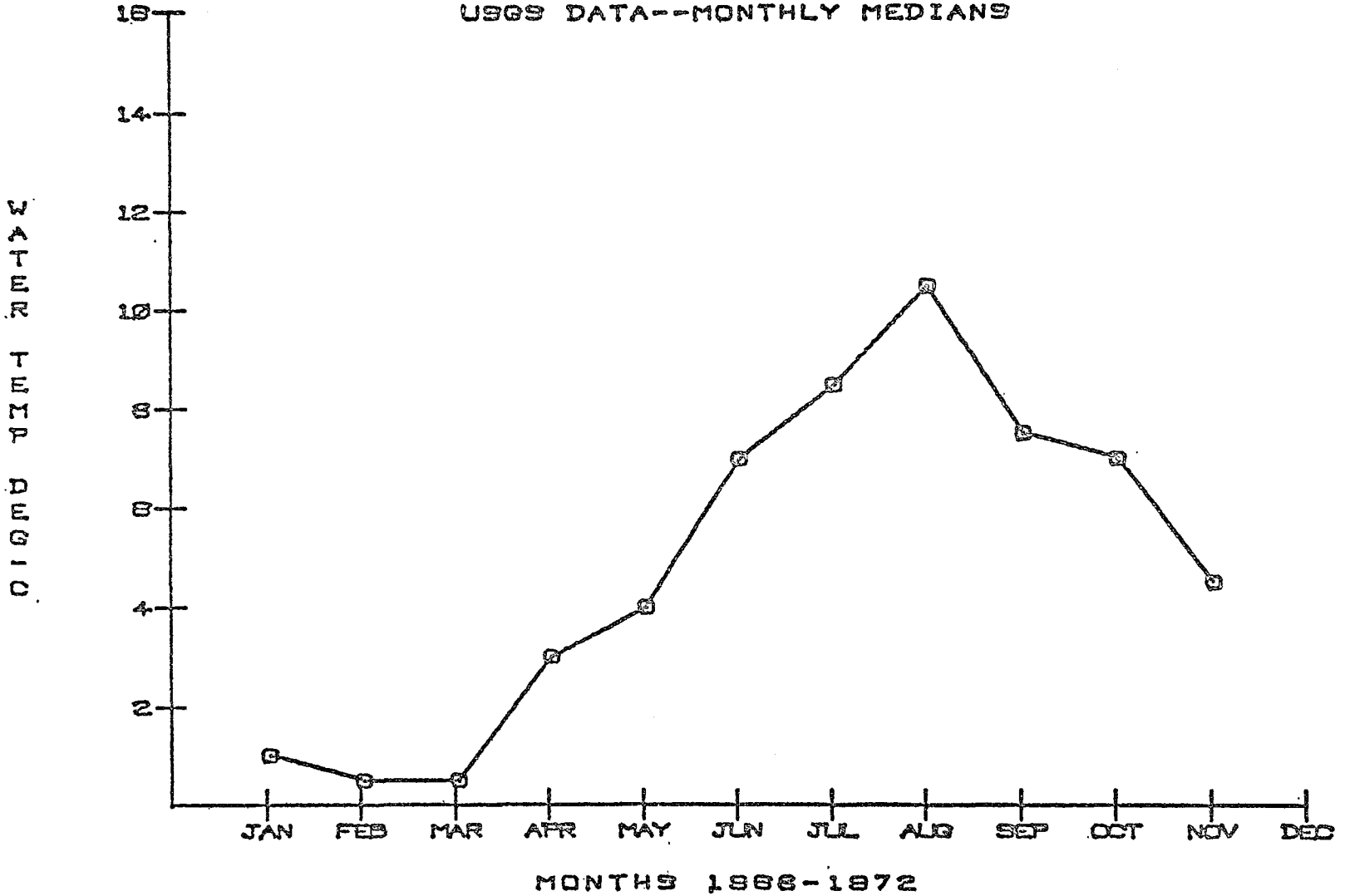
STATION NAME / RIVER MILES / STORET #	AGENCY #	DATE	SUMMARY	00930 SODIUM NA,DISS MG/L	00935 PTSSIUM K,DISS MG/L	00940 CHLORIDE CL MG/L	00945 SULFATE SO4-TOT MG/L	00950 FLUORIDE F,DISS MG/L	00955 SILICA DISS SOLVED MG/L	70301 DISS SOL SUM TONS/DAY	70302 DISS SOL TONS/DAY	80154 SUSP SED CONC MG/L	80155 SUSP SED DISCHARGE TONS/DAY
UNAMED RIVER													
0.0 / 0.0 / 0.0		51/10/04				2.2	6		5.0	31	20.80		
01524000	112WRD	55/10/04		1.80	0.30	1.5	8	0.00	3.3	28	27.60		
		56/06/26		1.20	0.60	3.2	3	0.00	4.5	27	96.20		
		56/10/04	1150	2.00	0.20	2.5	3	0.00	3.8	26	15.00		
		57/07/18		1.30	0.20	1.5	3	0.00	2.8	22	39.40		
		58/10/30	1205	2.50	0.30	4.5	4	0.20	4.3	29	103.00		
		58/01/10	1400	2.80	0.20	3.3	10	0.00	5.8	37	23.50	6	6.40
		58/03/26	0920	4.00	0.50	6.0	3	0.30	5.4	46	0.98		
		58/03/26	1130	4.60	0.30	7.4	2	0.20	5.6	37	0.75		
		58/03/27	1450	2.20	0.30	3.9	1	0.00	5.3	33	11.50	7	2.40
		58/03/27	1500	2.20	0.30	3.9	1	0.00	5.3	33	11.50		
		58/05/09	1715	2.90	0.20	2.5	4	0.10	5.6	36	27.30	5	3.80
		58/06/18	1230	1.60	0.10	1.9	4	0.00	4.5	28	116.00	2	8.30
		58/06/19	1315	4.90	0.30	6.6	4	0.00	5.8	39	0.99		
		58/07/31	1210	3.00	0.10	3.6	5	0.10	5.5	41	3.43		
		58/07/31	1700	4.20	0.10	6.0	3	0.00	6.4	37	2.10		
		58/08/07	1500	1.50	0.20	2.0	4	0.10	3.4	24	33.20	4	5.50
		58/08/07	1501								33.20		
		58/09/10		7.80	0.60	8.6	5	0.00	5.6	49			
		58/09/17	1200	1.80	0.20	2.1	2	0.00	3.6	24	75.20	4	13.00
		70/04/14	1145									2	1.30
		70/04/14	1150	2.70	0.20	3.0	5	0.20	4.4	35	23.40		
		70/05/27	1130	2.40	0.40	2.5	4	0.10	5.3	34	123.00		
		70/05/27	1200									5	18.00
		70/05/25	1200									4	22.00
		70/06/25	1330										
		70/08/03	1240								162.00		
		71/01/06	1130								115.00	2	9.20
		71/01/06		2.30	0.20	2.0	4	0.30	4.3	32	23.80	2	1.50
		71/05/26	1250									3	6.20
		71/07/21	1130									8	53.00
		71/10/22	1100									1	1.60
		72/04/14	1330									1	0.12
		STATION MEAN		2.84	0.28	3.7	4	0.08	4.8	33	45.37	4	10.02

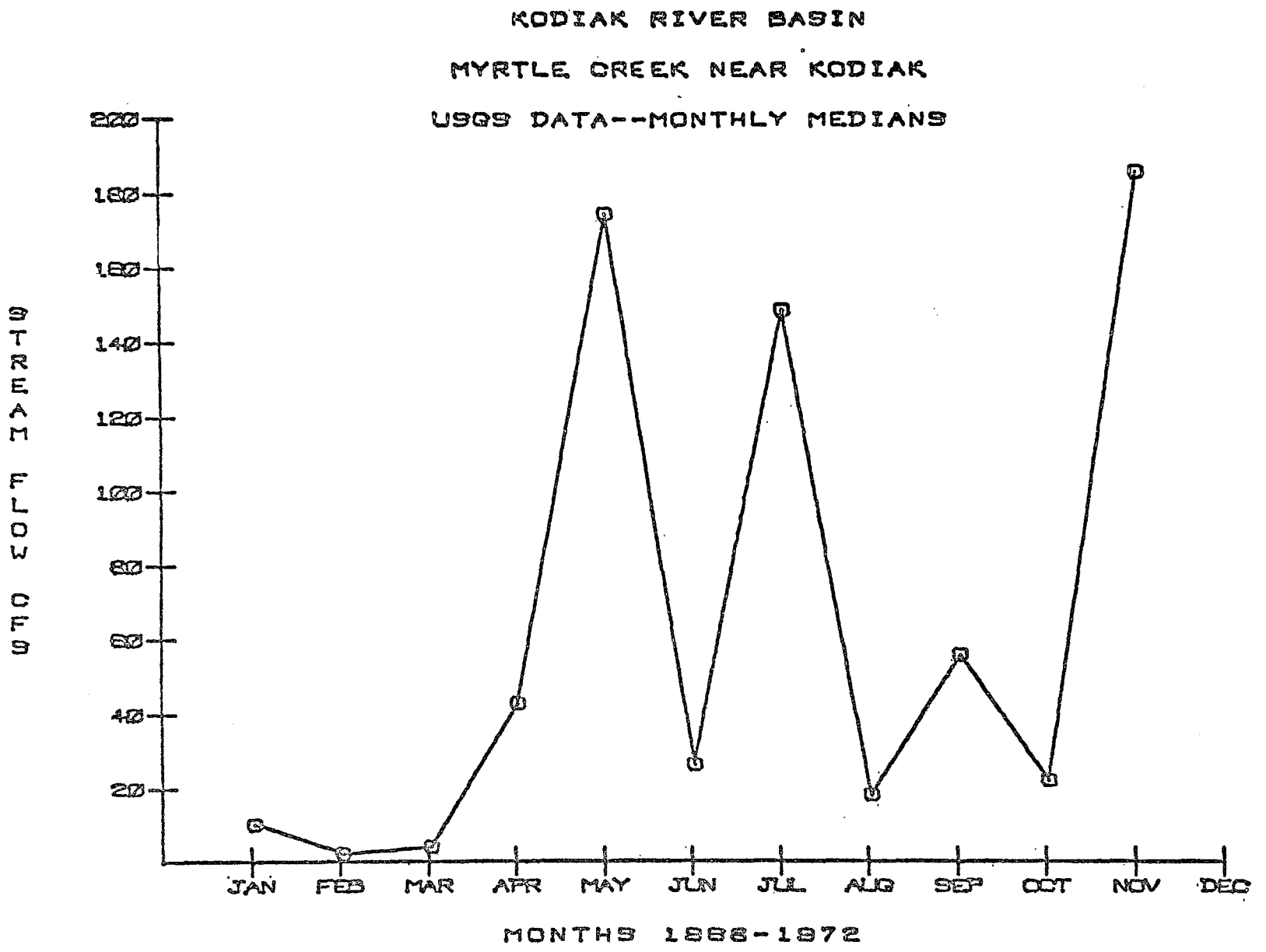
MYRTLE CREEK NEAR KODIAK

KODIAK RIVER BASIN

MYRTLE CREEK NEAR KODIAK

USGS DATA--MONTHLY MEDIANS

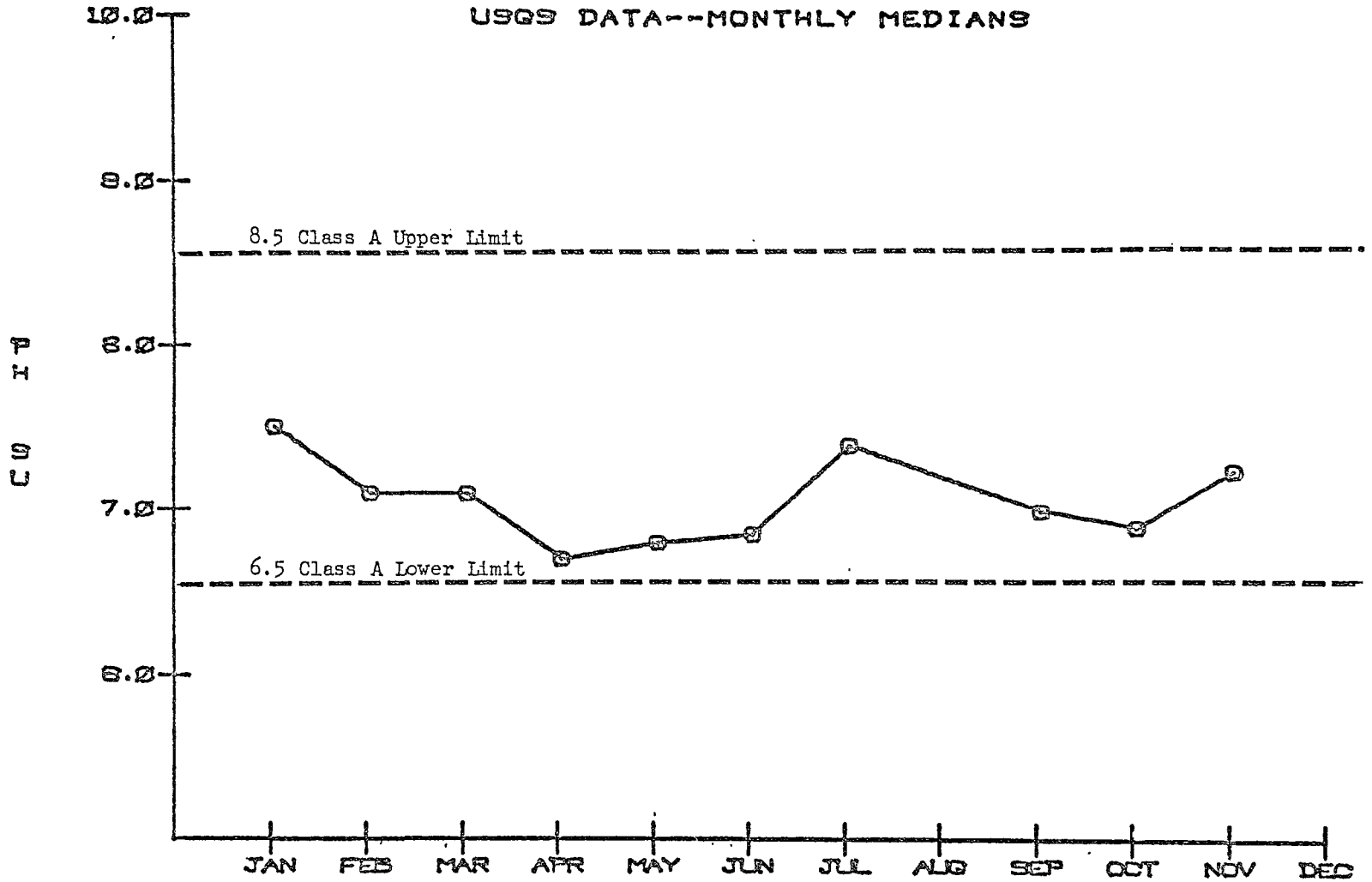



KODIAK RIVER BASIN
MYRTLE CREEK NEAR KODIAK
USGS DATA--MONTHLY MEDIANS
STREAM FLOW CFS
200
180
160
140
120
100
80
60
40
20
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS 1966-1972

KODIAK RIVER BASIN

MYRTLE CREEK NEAR KODIAK

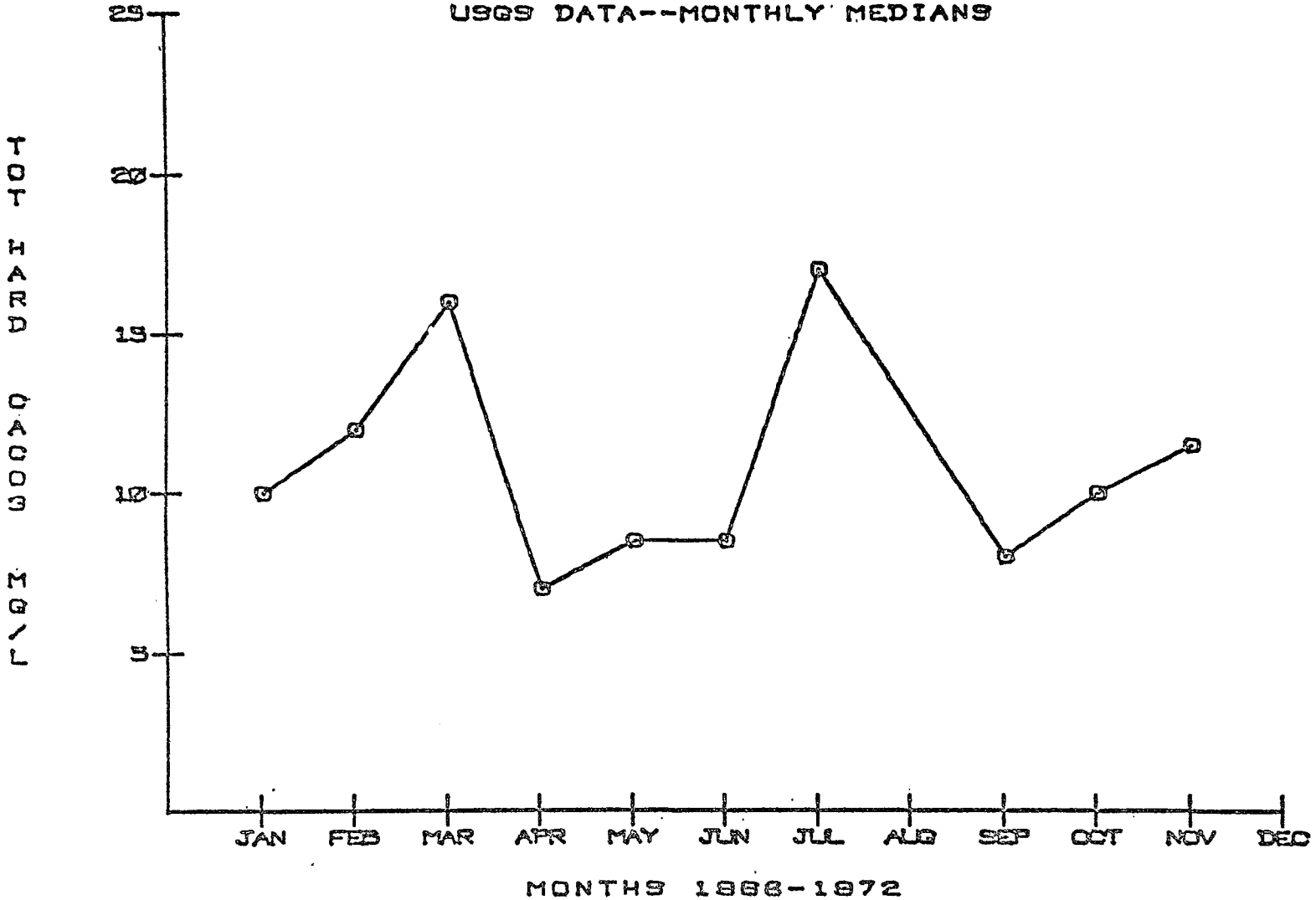
USGS DATA--MONTHLY MEDIANS

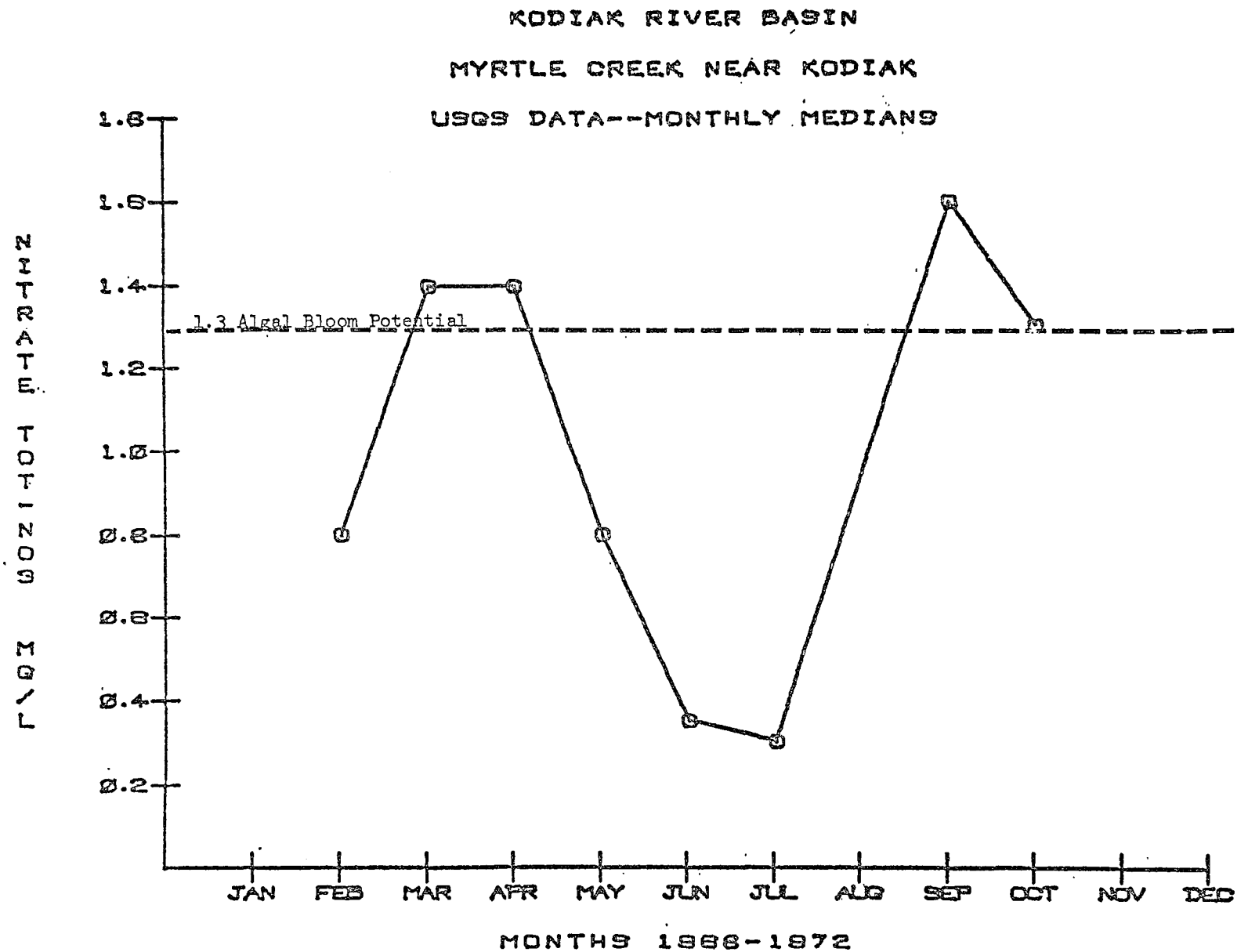


KODIAK RIVER BASIN

MYRTLE CREEK NEAR KODIAK

USGS DATA--MONTHLY MEDIANS



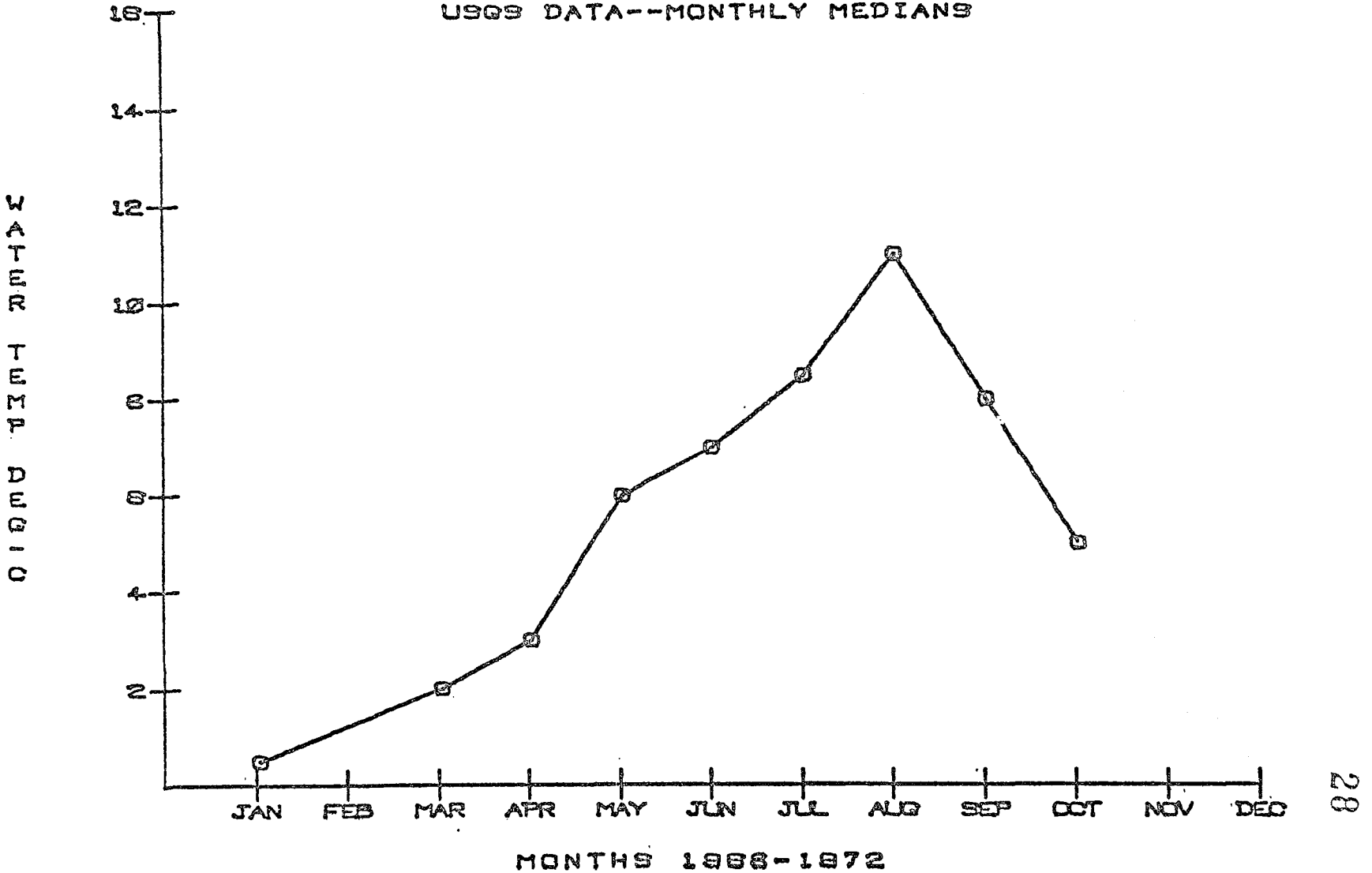

KODIAK RIVER BASIN
MYRTLE CREEK NEAR KODIAK
USGS DATA--MONTHLY MEDIANS
NITRATE TOTINOS MG/L
1.6
1.8
1.4
1.3 Algal Bloom Potential
1.2
1.0
Ø.8
Ø.6
Ø.4
Ø.2
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS 1966-1972

UGANIK RIVER NEAR KODIAK

KODIAK RIVER BASIN

UGANIK RIVER NEAR KODIAK

USGS DATA--MONTHLY MEDIANS



KODIAK RIVER BASIN

UGANIK RIVER NEAR KODIAK

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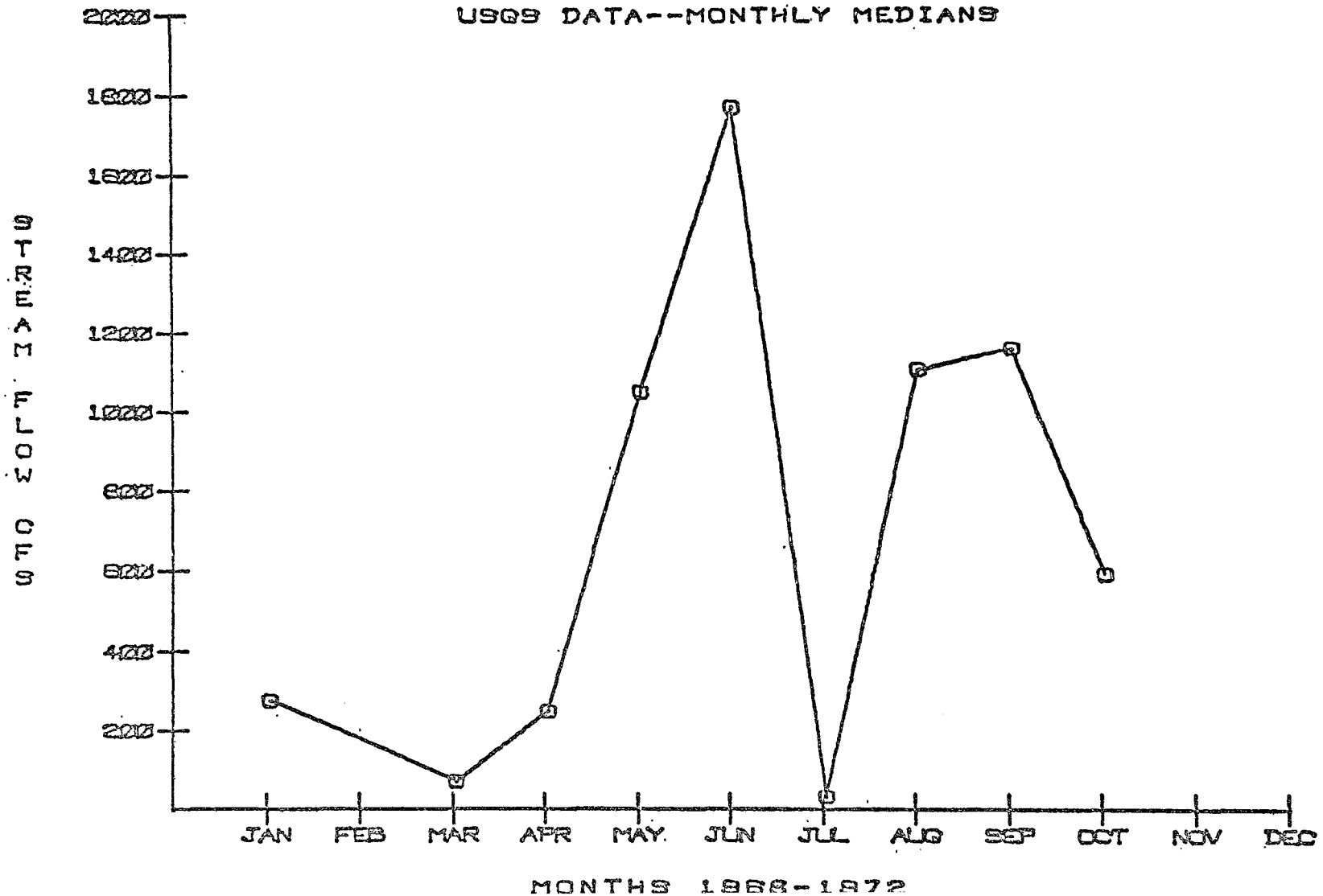

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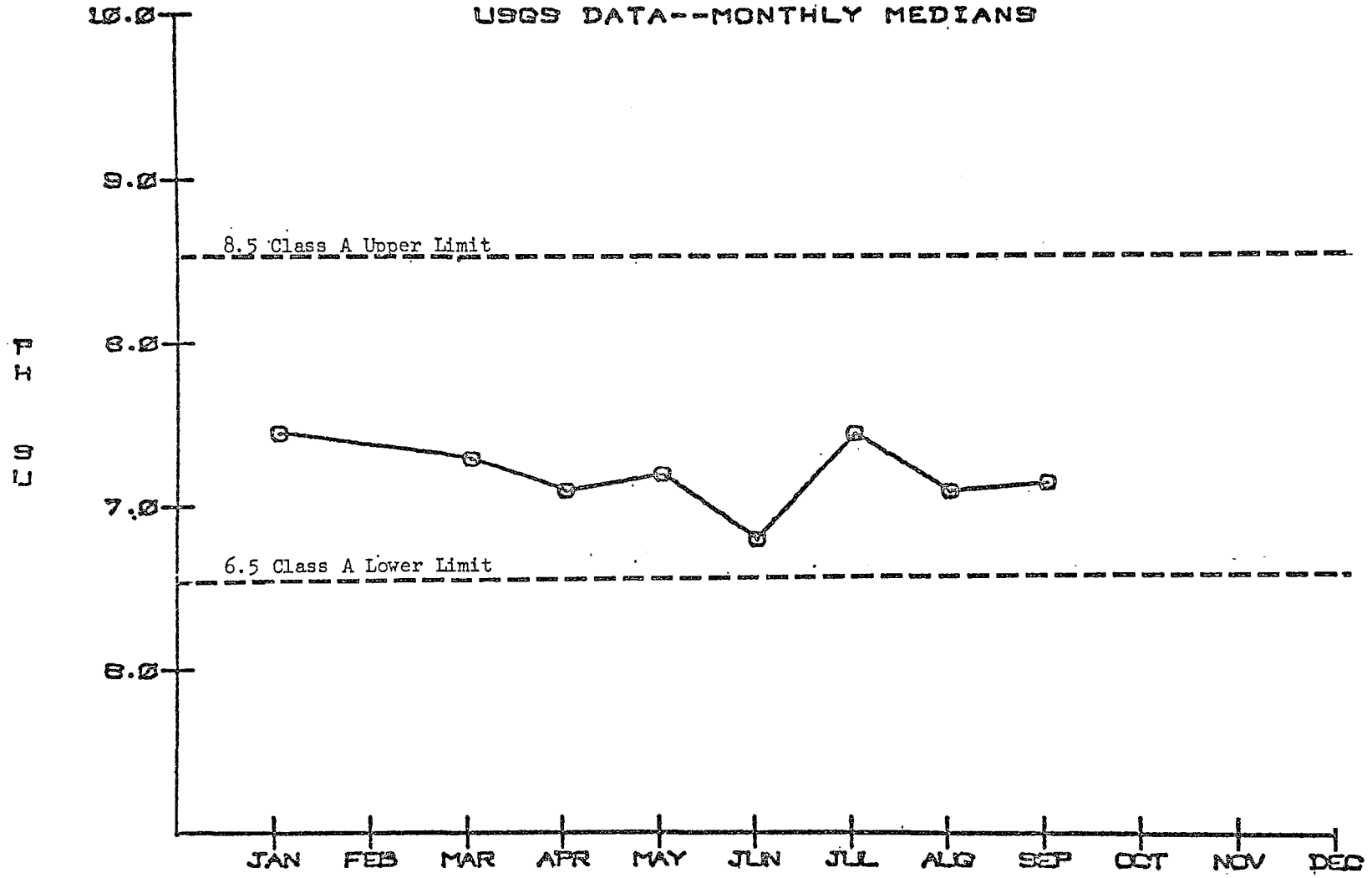
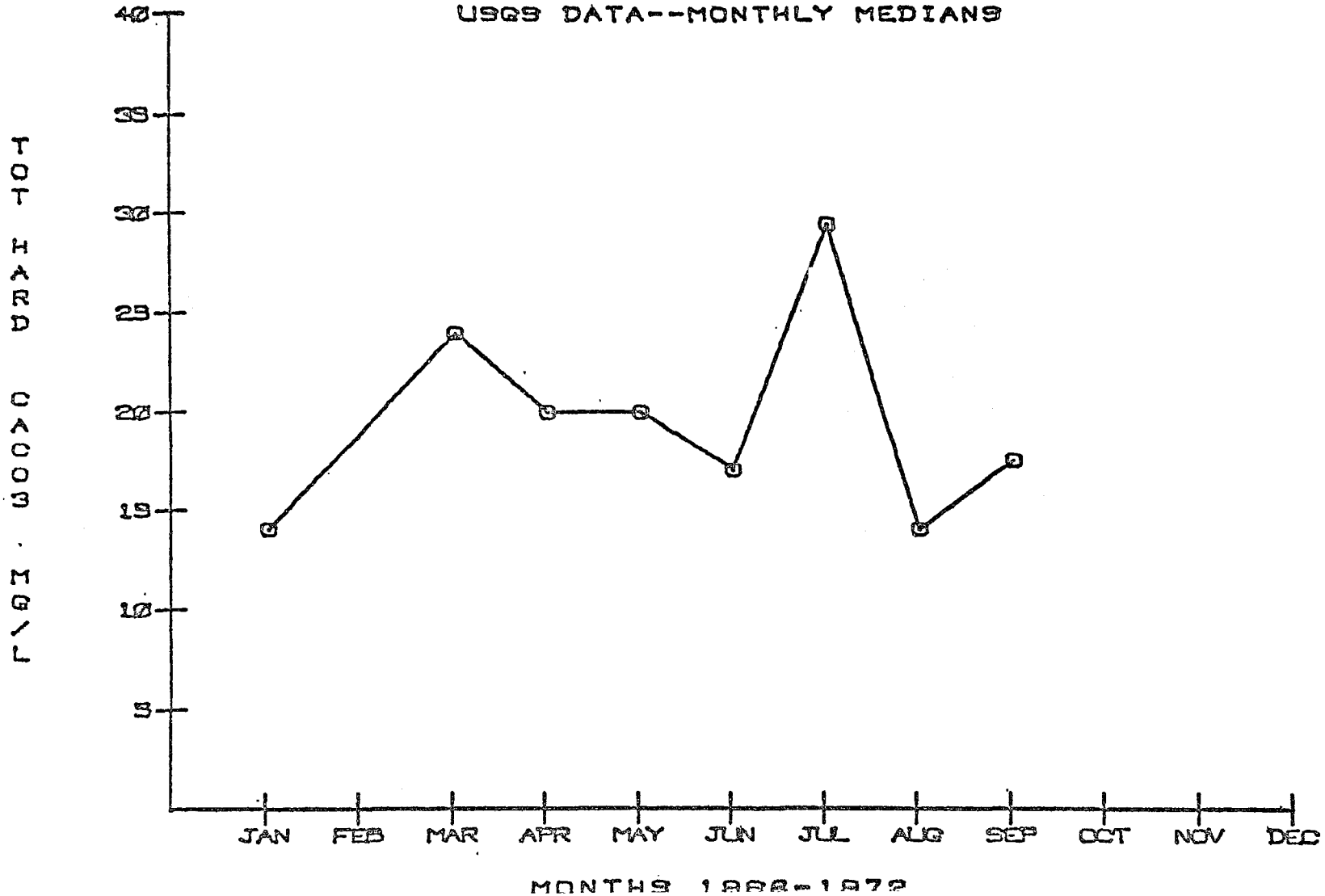


KODIAK RIVER BASIN

UGANIK RIVER NEAR KODIAK

USGS DATA--MONTHLY MEDIANS



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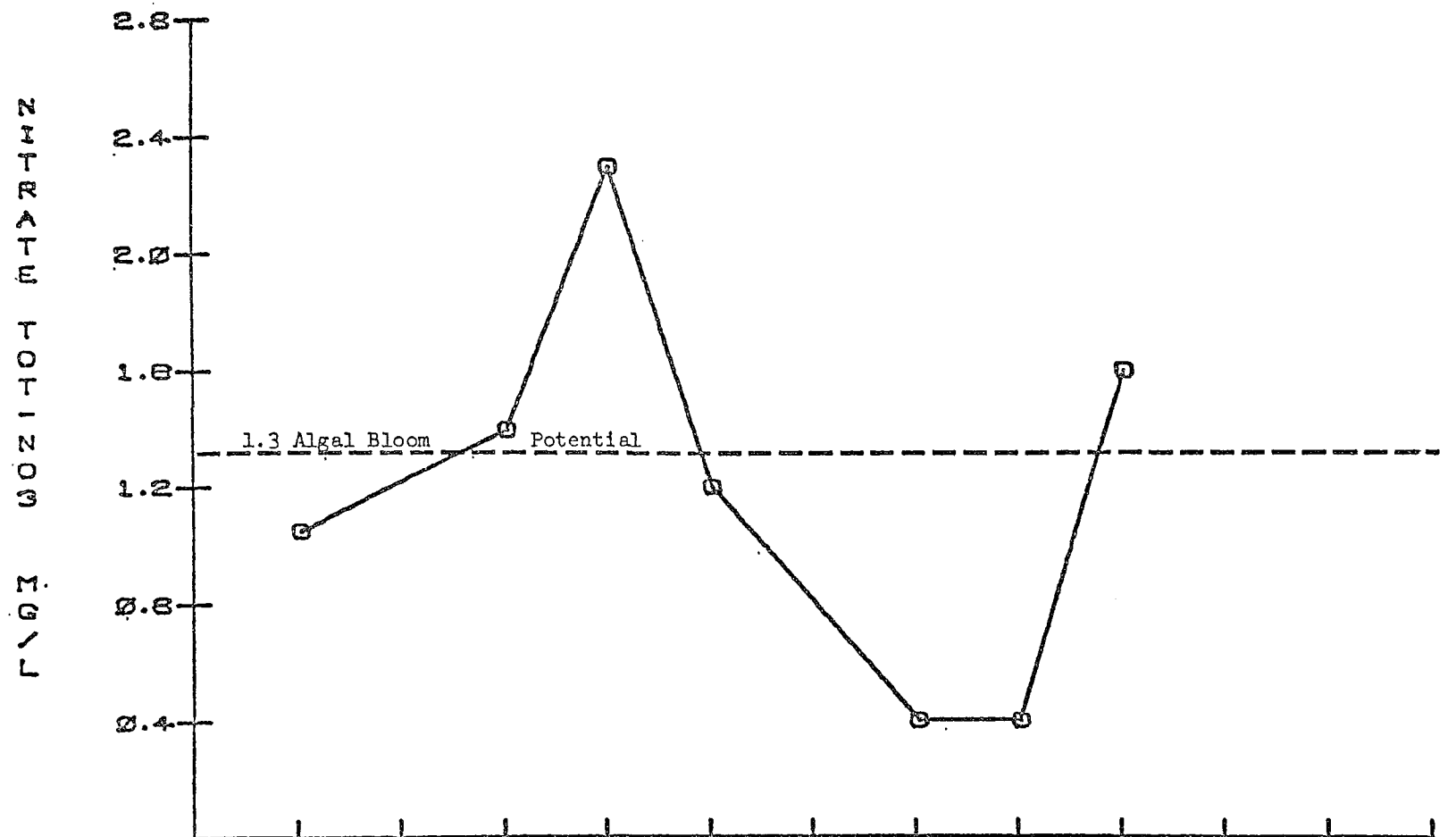
UGANIK RIVER NEAR KODIAK

USGS DATA--MONTHLY MEDIANS



SOURCE PROFILE

TABLE 2

POINT SOURCE SUMMARY

PARAMETER	INDUSTRIAL #/day	INDUSTRIAL %	MUNICIPAL #/day	MUNICIPAL %
BOD_5	94278.7	98.9	1049.8	1.1
NO_3 - NITRATE	23.2	8.4	254.4	91.6
TOTAL PHOS.	1135	92.0	98.4	8.0
COD	262996.2	100	-	-
SUSP.SOL.	215541.7	100	-	-
SET.SOL.	341571.6	100	-	-

- No data available

TABLE 3

KODIAK BASIN

Municipal Point Sources

DISCHARGER	RECEIVING WATER	POP.	FLOW MGD	BOD lb/d	%	T.PHOS. lb/d	%	NO_3 lb/d	%
Powells Trailer Court	Chiniak Bay	200	.0015	34.0	3.2	1.9	1.9	4.9	1.9
Old Harbor Sewerage System	Sitkalidak Strt.	500	0.05	57.0	5.4	4.4	4.5	12.3	4.8
City of Kodiak	St. Paul Harbor	5000	1.0	850	81.0	47.9	48.7	123.3	48.5
DOT Coast Guard Base Kodiak	St. Paul Harbor	5000	0.5	70.0	6.7	40.7	41.4	104.8	41.2
DOT Coast Guard Base Spruce Cape Loran	Gulf of Alaska	200	.0001	4.8	*	1.6	1.6	4.2	1.7
DOT Coast Guard Sitkinak Loran Sta.	Gulf of Alaska	200	.0001	34.0	3.2	1.9	1.9	4.9	1.9

* Indicates less than 1%

TABLE 4

INDUSTRIAL POINT SOURCES

Discharger	RECEIVING WATER	MGD	BOD lb/d	%	NO_3 lb/d	%	T.PHOS. lb/d	%	SUSP.SOL. lb/d	%	SET.SOL lb/d	%	COD lb/d	%
Pan Alaska Fisheries	St. Paul Harbor	0.252	-	-	-	-	-	-	698.9	*	33241.6	9.7	3986.2	1.5
Pacific Pearl Seafood (Martin Plant)	Kodiak Harbor	0.162	-	-	-	-	-	-	136.5	*	900.7	*	571.5	*
Pacific Pearl Seafood (Roxanne Plant)	St. Paul Harbor	0.116	-	-	-	-	-	-	244.2	*	3240.9	1.0	1325.6	*
Pacific Pearl Seafood (Kinnear-Wendt)	St. Paul Harbor	0.205	-	-	-	-	-	-	567.3	*	11967.8	3.5	2344.8	*
North Pacific Processors	Kodiak Harbor	0.065	-	-	-	-	-	-	160.6	*	4238.8	1.2	1070.2	*
Alaska Packers Ass.	Larsen Bay	0.143	3176.8	3.4	1.7	7.3	235.7	20.8	14085	6.5	-	-	5412	2.1
Alaska-Shell Inc.	Jap Bay	0.288	4300	4.6	-	-	2.3	*	6500	3.0	-	-	11500	4.4
B & B Fisheries	St. Paul Harbor	0.508	-	-	-	-	-	-	2394.9	1.1	25747.9	7.5	5964.7	2.3
Alaska Packers Ass.	Kodiak Harbor	0.415	-	-	-	-	-	-	748.2	*	20535.9	6.0	6162	2.3
Alaska Pacific Seafood	St. Paul Harbor	0.334	-	-	-	-	-	-	1008.6	*	10813	3.2	3836.2	1.5
East Point Seafood	St. Paul Harbor	0.67	-	-	-	-	-	-	5671.6	2.6	36320.7	10.6	14821.1	5.6
Columbia-Wards Fisheries (Icy Cape Cannery)	Kodiak Harbor	0.0035	-	-	-	-	-	-	22.2	*	293.3	*	107.2	*
Wakefield Seafoods	Kizhuyak Bay	0.003	1.1	*	-	-	-	-	1.1	*	-	-	-	-

* indicates less than 1%
- No data available

TABLE 4

INDUSTRIAL POINT SOURCES

DISCHARGER	RECEIVING WATER	FLOW MGD	BOD lb/d	%	NO_3 lb/d	%	T.PHOS. lb/d	%	SUSP.SOL. lb/d	%	SET.SOL. lb/d	%	COD lb/d	%
Columbia-Wards Fisheries (Port Bailey)	Dry Spruce Bay	0.097	38317	40.6	2.5	10.8	1.0	*	38500	17.9	-	-	54050	20.6
New England Fish Co. (Gibson Cove)	Gibson Cove	0.26	-	-	-	-	-	-	1054.9	*	7329.2	2.2	4391.6	1.7
New England Fish Co.	Kodiak Harbor	0.103	-	-	-	-	-	-	69.3	*	1900.1	*	396.2	*
Northern Processors	St. Paul Harbor	0.083	-	-	-	-	-	-	496.7	*	31471.3	9.2	3278.9	1.2
Kodiak Island Seafood	Larsen Bay	0.143	3176.7	3.4	4.3	18.5	235.7	20.8	14085	6.5	-	-	5412	1.9
Kodiak Electric Ass.	Kodiak Harbor	0.423	14.0	*	-	-	0.04	*	10	*	-	-	2502	1.0
Kodiak King Crab	Zachar Bay	0.01	8.5	*	1.2	5.2	0.5	*	-	-	-	-	-	-
Roy Furfiord M/V Aleutian Fjord	Sitkalidak Strt.	0.095	7222.8	7.6	0.74	3.2	0.29	*	812.8	*	-	-	1751	*
Mokuhana Fisheries	Unalaska Bay	0.293	0.48	*	0.42	1.8	0.16	*	720.8	*	51140.8	15.0	3365.6	1.3
Universal Seafood	Unalaska Bay	2.47	-	-	-	-	-	-	7106.9	3.3	37050	10.9	32959.6	12.5
Columbia-Wards Fisheries (Alitak)	Lazy Bay	0.275	18974.7	20.1	2.7	11.6	167.3	14.7	21770	10.1	-	-	22943	8.7
C & C Fisheries	Narrow Strait	0.001	1.7	*	0.3	1.3	0.1	*	-	-	-	-	-	-
Bio-Dry, Inc.	St. Paul Harbor	0.001	1.02	*	0.15	*	0.06	*	-	-	-	-	-	-
Roy Furfiord M/V Konya	Sitkalidak Strt.	0.38	3486.8	3.7	-	-	13.3	*	3874	1.8	-	-	6110	2.3
Middle Bay Fisheries	Middle Bay	-	5.1	*	0.74	3.2	0.28	*	-	-	-	-	-	-
Whitney-Fidalgo Seafood	Uyak Bay	0.005	15.3	*	2.2	9.5	0.8	*	-	-	-	-	-	-
Washington Fish & Oyster	Shuyak Strt.	0.005	5.1	*	0.7	3.0	0.3	*	-	-	-	-	-	-
Wakefield Seafoods	Captains Bay	2.5	15406	16.3	0.8	3.4	66.8	5.9	89600	41.6	-	-	48200	18.3
New England Fish Co.	Uganik Bay	0.27	155.4	*	3.2	13.8	409.8	36.1	61	*	-	-	184.6	*
Zachar Bay Fisheries	Zachar Bay	0.065	10.2	*	1.5	6.5	0.6	*	-	-	-	-	-	-
Kodiak King Crab	St. Paul Harbor	0.638	-	-	-	-	-	-	3317.7	1.5	28744.3	8.4	11711.9	4.5
Whitney-Fidalgo Seafood	Kodiak Harbor	0.130	-	-	-	-	-	-	604.6	*	8469.2	2.5	3303.3	1.3
Ursin Seafood	St. Paul Harbor	0.130	-	-	-	-	-	-	691.8	*	25666.6	7.5	4226.3	1.6
Queen Fisheries	Kodiak Harbor	0.111	-	-	-	-	-	-	527.1	*	2499.5	*	1108.1	*

* Indicates less than 1%
\- No data available

CAUSE & EFFECT ANALYSIS

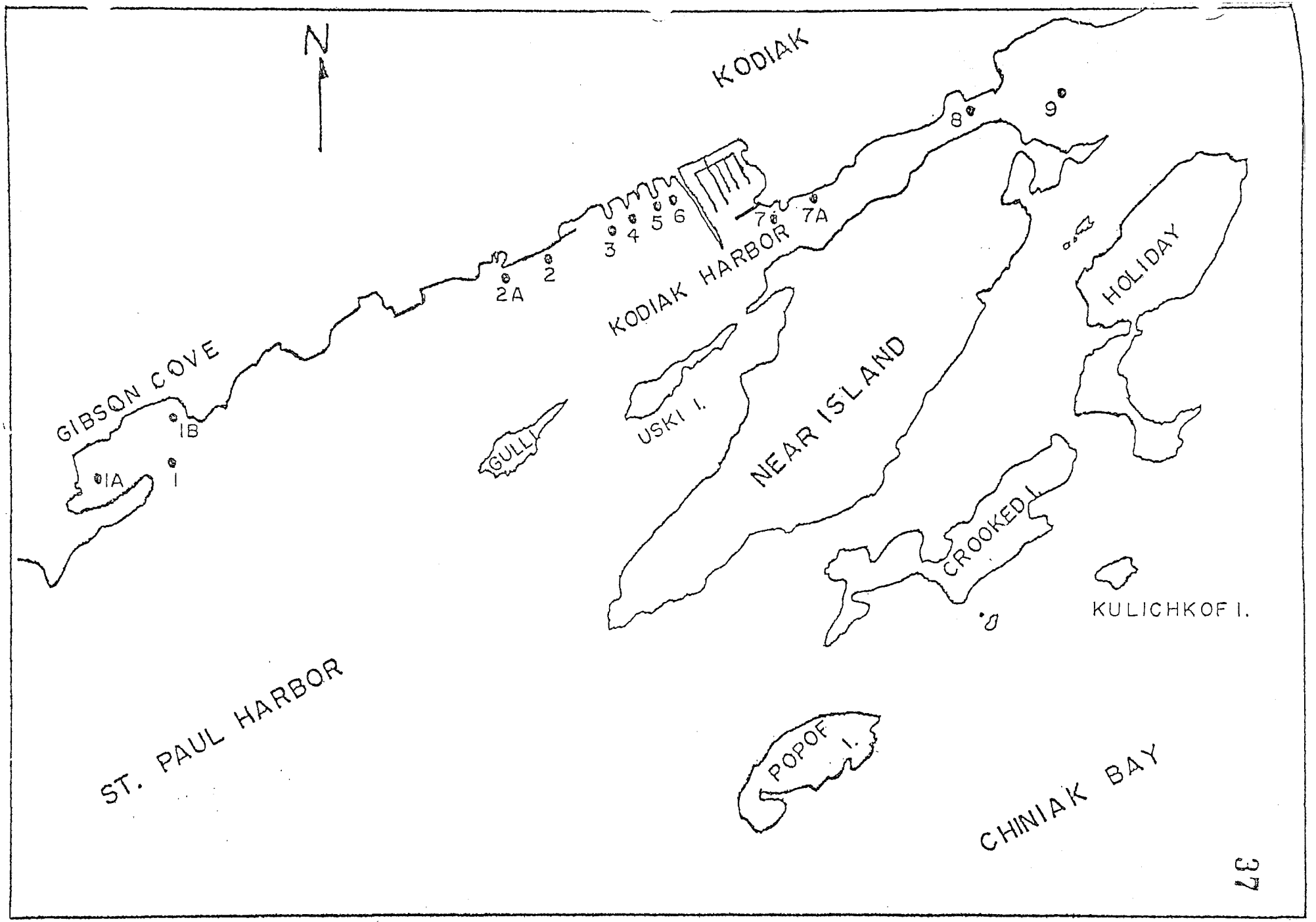


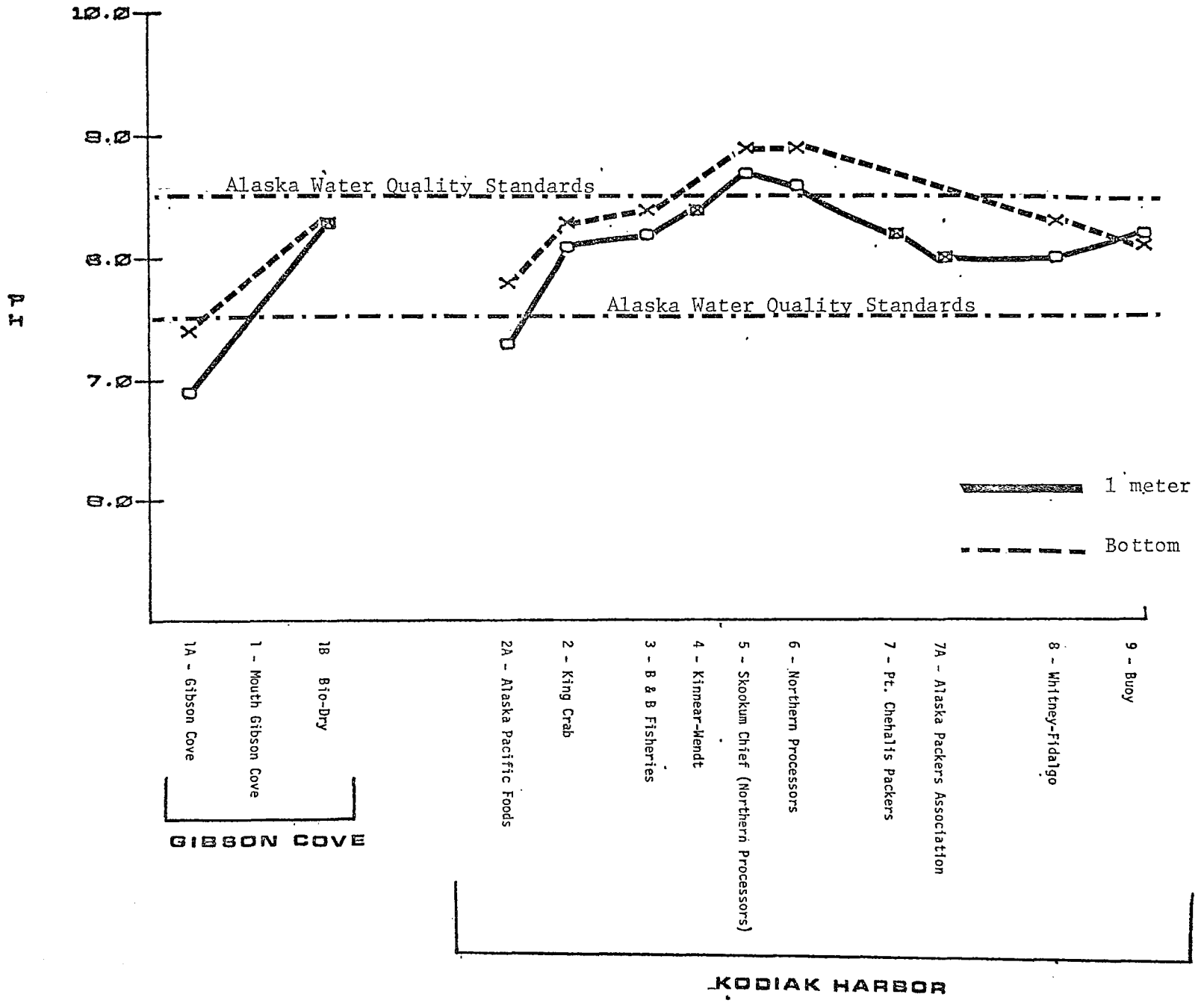
Figure 2. Locations of Water Quality Stations in Gibson Cove and Kodiak Harbor, August 1974.

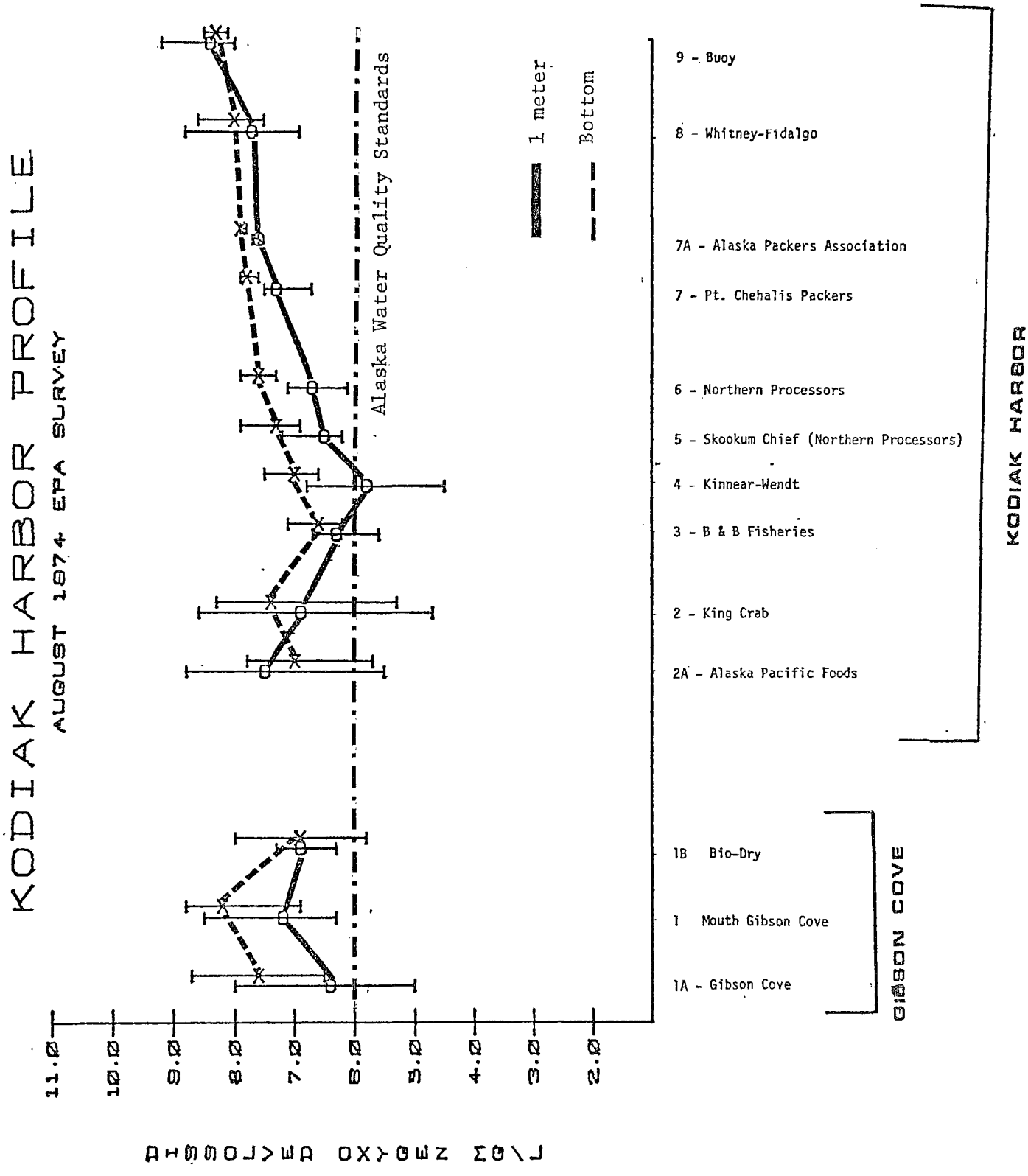
KODIAK HARBOR PROFILE

AUGUST 1974 EPA SURVEY

KODIAK HARBOR PROFILE

AUGUST 1974 EPA SURVEY




KODIAK HARBOR PROFILE
AUGUST 1974 EPA SURVEY
Alaska Water Quality Standards
1 meter
Bottom
9 - Buoy
8 - Whitney-Fidalgo
7A - Alaska Packers Association
7 - Pt. Chehalis Packers
6 - Northern Processors
5 - Skookum Chief (Northern Processors)
4 - Kinnear-Wendt
3 - B & B Fisheries
2 - King Crab
2A - Alaska Pacific Foods
1B Bio-Dry
1 Mouth Gibson Cove
1A - Gibson Cove
KODIAK HARBOR
GIBSON COVE
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0

KODIAK HARBOR

AUGUST 1971 EPA SURVEY

DISSOLVED OXYGEN IN MG/L

13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0

Alaska Water Quality Standard

1 meter

Bottom

1 - Mouth Gibson Cove

GIBSON COVE

2 King Crab

2A - Alaska Pacific Foods

3 - B & B Fisheries

4 - Kinnear-Wendt

5 - Skookum Chief (Northern Processors)

6 - Northern Processors

7 - Pt. Chehalis Packers

7A - Alaska Packers Association

8 - Whitney-Fidalgo

9 - Buoy

KODIAK HARBOR

KODIAK HARBOR PROFILE

AUGUST 1974 EPA SURVEY

CHEMICAL & PHYSICAL ASPECTS OF BOTTOM DEPOSITS

Marine deposits not influenced by wastewater discharges that contain settleable organic solids are characterized as consisting, on a dry weight basis, of less than 5% organic matter and volatile solids, less than 0.10 gram/kilogram of organic nitrogen and sulfides and less than 5 grams/kilogram of chemical oxygen demand. These values were exceeded in almost all of the samples collected during the August 1974 survey (Table 4 and Figure 3 &4).

The values reported for chemical oxygen demand, organic nitrogen and sulfides at all stations greatly exceed the values of 5, and 0.10 for these parameters. Only 2 of the values for percent organic matter did not exceed the 5% criterion (Stations 3C and 3D), and only one, Station 3D, did not exceed the 5% volatile solids criterion. The criterion for sulfides, organic nitrogen, and chemical oxygen demand were exceeded at each of these stations.

Similar findings were also apparent during the May & August surveys in 1971 (Table 5). The only samples collected for chemical analyses in 1974 were those in Kodiak Harbor that were suspect of poor quality chemically, plus Station 1A (Figure 3 & 4), to determine whether there were any major changes in these deposits. Inspection of the chemical data for the two different years reveals that no major changes have occurred in the chemical characteristics of the bottom deposits in Kodiak Harbor. Although no 1971 data are available for the bottom deposits in Gibson Cove, it is apparent that those in the reach adjacent to the New England Fish Company have become sufficiently contaminated to be of significant concern.

The cause of this contamination in Gibson Cove is the discharge of wastewaters from broken discharge lines inside the cove and the discharge of wastes near the mouth of the cove that are transported by wind and wave action to the interior of the cove. In addition, since 1971 the Bio-Dry Company, with its discharge near the mouth of the cove, has been installed on the cove shore easterly of the existing cannery. Like the waste discharge line from the cannery, there have been breaks in the outfall line from the Bio-Dry facility, and these wastes have added similarly to the discharges that degrade water quality in the cove.

VISUAL AND BIOLOGICAL ASPECTS OF BOTTOM DEPOSITS

The unpublished EPA report for the 1971 survey (2) indicates living macroscopic animals were not found at stations immediately adjacent to the canneries in Kodiak Harbor. Rather, only

sludge and discarded animal parts were found at these locations, and hydrogen sulfide bubbles were profuse near the surface as were floating seafood animal parts and bulked sludge.

As was found during the 1971 surveys, none of the samples collected during the 1974 survey had readily apparent attached marine plants. Unlike the 1971 survey though, a general improvement in the bottom reaches of Kodiak Harbor was perceptible. These differences, specifically a slight increase in the occurrence and abundance of polychaete worms, the great reduction in quantities of fresh, seafood-animal remains, the lack of floating sludge and hydrogen sulfide bubbles on the surface waters, and the decrease in intensity of water discoloration, is evidence that installation of screens in process wastewater lines since 1971 has resulted in a preceptible improvement in the bottom reaches of Kodiak Harbor.

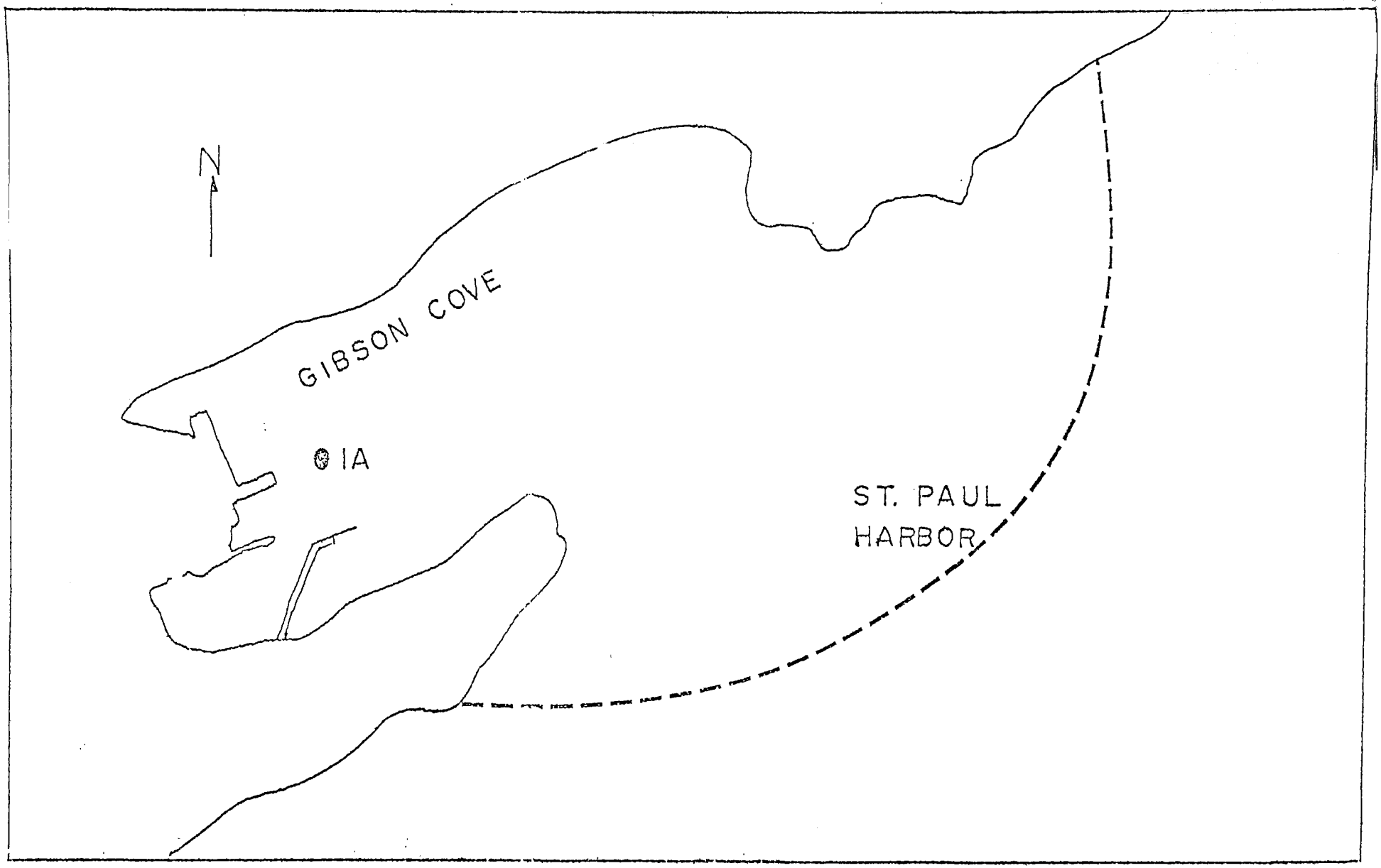


Figure 3. Location of Bottom Deposit Sampling Site in Gibson Cove.

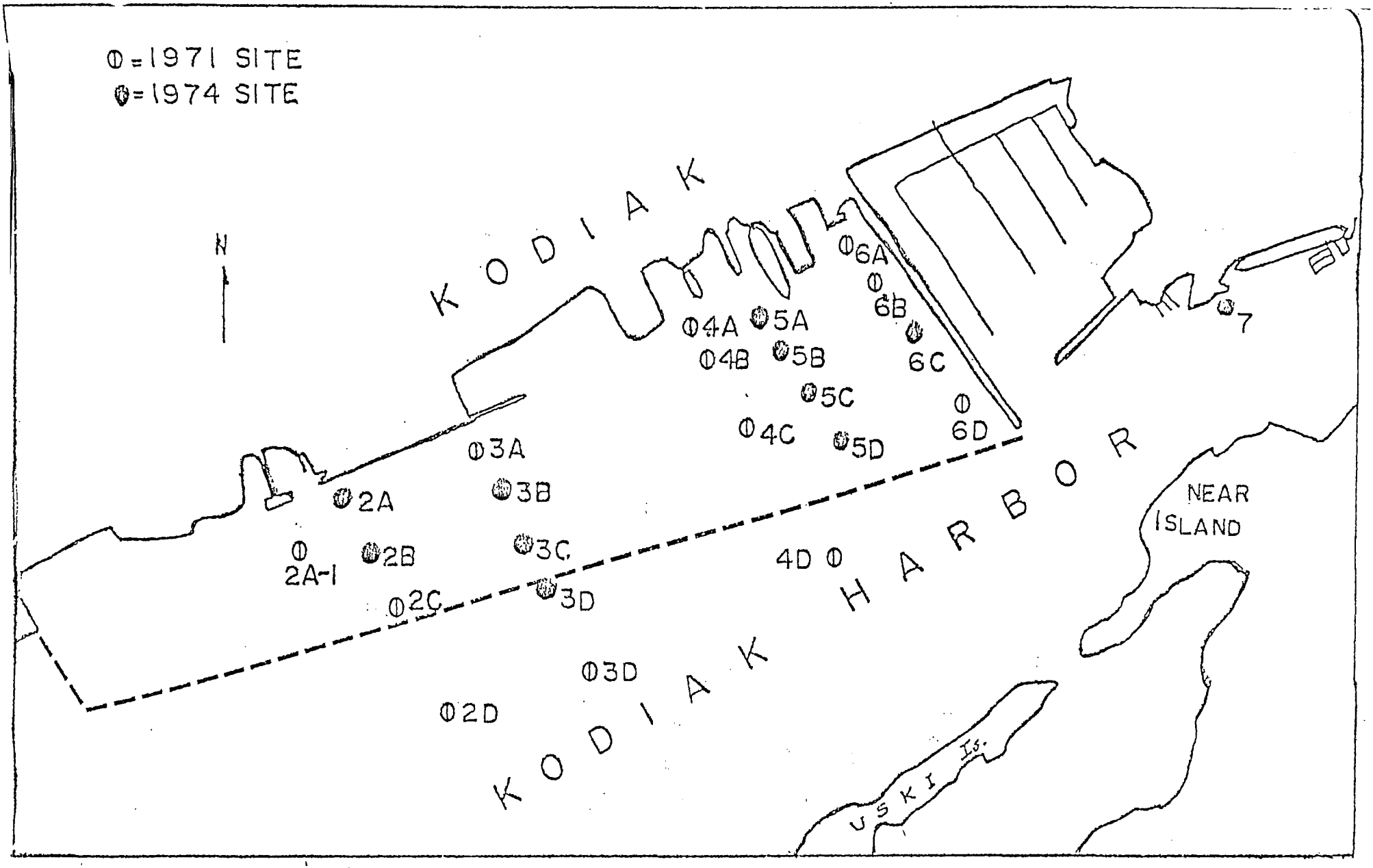


Figure 4. Location of Bottom Sampling Sites in 1971 and 1974 in Kodiak Harbor.

TABLE 5

CHEMICAL AND PHYSICAL CHARACTERISTICS OF BOTTOM DEPOSITS IN GIBSON COVE AND KODIAK HARBOR AUGUST 1974*

STATION NUMBER	PARAMETER					
	% SOLIDS (1)	% VOLATILE SOLIDS (2)	% ORGANIC CARBON (2)	SULFIDES (3) (g/kg)	ORGANIC NITROGEN (3) (g/kg)	CHEMICAL OXYGEN DEMAND (2) (g/kg)
1A	47.4	6.5	5.3	1.5	2.7	62
2A	40.0	14.8	10.2	1.4	8.8	122
2B	28.3	8.3	7.1	1.7	4.2	81
3B	37.5	7.5	6.4	1.9	4.3	76
3C	51.2	7.2	3.9	1.0	1.8	45
3D	52.6	4.8	2.7	0.9	1.5	31
5A	29.4	31.8	13.9	1.7	1.6	164
5B	16.9	15.1	14.2	3.9	9.5	169
5C	35.4	7.6	6.8	1.7	2.5	79
5D	20.1	8.7	7.0	1.9	4.5	84
6C	33.4	10.5	13.4	1.5	4.5	104
7	18.7	18.2	8.7	3.0	8.6	155

*All values are on a dry weight basis.
(1)Values after water has been evaporated.
(2)A value of 5 or greater is considered excessive.
(3)A value of 0.10 or greater is considered excessive.

TABLE 6

CHEMICAL AND PHYSICAL CHARACTERISTICS OF BOTTOM DEPOSITS IN KODIAK HARBOR, MAY AND AUGUST, 1971

STATION NUMBERS	% TOTAL SOLIDS (1)	% VOLATILE SOLIDS (2)	% ORGANIC CARBON (2)	% ORGANIC NITROGEN (3) (G/KG)
		MAY 13, 1971		
2A-1	56	5	2.1	0.48
2A	84	25	13.0	2.0
2B	58	6	2.5	0.33
2C	56	4	1.7	0.23
3A	67	22	14.9	3.7
3B	60	7	3.6	0.53
3C	56	5	2.3	0.33
4A	85	29	16.7	2.0
4B	59	6	2.7	0.40
4C	55	5	2.4	0.33
5A	76	19	16.4	2.36
5B	59	6	3.1	0.50
5C	60	6	2.7	0.43
5D	53	4	2.0	0.28
6A	66	9	4.3	0.42
6B	63	7	3.3	0.48
6C	52	5	2.2	0.31
7	65	11	6.1	0.94
		AUGUST 11, 1971		
2A	87	44	23.1	3.1
2B	84	41	3.9	2.4
2C	46	3	1.4	0.2
2D	51	12	1.4	0.2
4A	75	29	15.6	1.5
4B	60	7	3.2	0.5
4C	49	4	5.4	0.2

*All values are on a dry weight basis.
(1) Values after water has been evaporated.
(2) A value of 5 or greater is considered excessive.
(3) A value of 0.10 or greater is considered excessive.

BIBLIOGRAPHY

BIBLIOGRAPHY

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3. University of Alaska, Institute of Marine Science, "An Oceanographic Reconnaissance of the Waters Around Kodiak Island, Alaska," July 1970.

4. State of Alaska, Department of Environmental Conservation, "Water Quality Standards," as revised, October 1973.