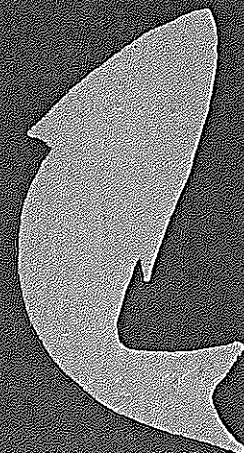
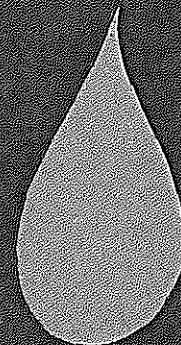
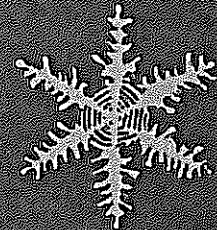


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INSTITUTE OF WATER RESOURCES



A GROUND WATER QUALITY SUMMARY
FOR ALASKA

by

Steve W. Kim, Phillip R. Johnson
and R. Sage Murphy

Report No. IWR-10

A GROUND WATER QUALITY SUMMARY FOR ALASKA

A Termination Report

by

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A ground water quality summary for Alaska: A termination report
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INTRODUCTION

The expanding economic activity throughout the State of Alaska has created an urgent demand for water resource data. Ground water quality information is of particular interest since this is the most used source for domestic and industrial supplies.

Many agencies and individuals have accumulated large quantities of data but their value has been marginal due to a lack of distribution to potential users. It was the original intent of the work reported herein to gather, collate, and publish all ground water quality data available in the files of university, state, and federal laboratories. Soon after the inception of the project the major contributor, the U.S. Geological Survey, found it was administratively impossible to contribute either the monies or the data necessary to accomplish the ultimate goals of the project -- *An Atlas on Alaskan Ground Water Qualities*.

At the time the above decision was made the Institute felt too much information was on hand to allow it to lay fallow. Therefore, this report was prepared, in a more limited scope than originally planned, to fill the need for a readily available source of information.

ACKNOWLEDGEMENTS

The concept and original planning of this work was under the direction of Dr. Charles E. Behlke. Other duties forced him to curtail his efforts on the work. We acknowledge the cooperation and assistance of Mr. Harry Hulsing, District Chief, Mr. D.A. Morris, Assistant District Chief, and Mr. A.J. Feulner, Engineer, all of the U.S. Geological Survey, Anchorage, Alaska.

The work upon which this report is based was supported by funds provided by the U.S. Department of the Interior, Office of Water Resources Research, Project Number A-024-ALAS and Agreement Number 14-01-0001-1070.

SCOPE

Preliminary analysis of the data revealed a complete absence of data north of the Brooks Range and an overabundance of data in the major cities of Juneau, Fairbanks, and Anchorage. At the time of this writing little information on the water resource of the North Slope, either ground or surface, is open to the public because of the need for industrial security in and around petroleum developments. Except for a few isolated locations, the vast majority of the waters of possible use will prove to be surface since the area is underlain with 1,000 feet of permafrost.

The significance of reporting excessive amounts of data on the three above mentioned communities is not thought to be of great value for this publication. Since these are the most populous areas in the state, local firms and agencies have the data readily available. In addition the quality varies considerably within short distances in these areas, making it nearly impossible to adequately describe all the characteristics available. Since the object of the report is to present an over-view of the state's ground water quality, limited information is included for the cities in question. For individuals desirous of additional information local authorities, consulting engineers, and well drillers should be contacted.

The information presented is meant to show the general characteristics of the ground water, with particular emphasis on those parameters important to domestic and/or industrial consumers. We have attempted to

be concise at the risk of being vague. It is hoped that the information will be of particular benefit to those new to the area. However, it must be realized the information can only be used as a general guide, and each new installation should be developed individually.

Exhibit I

GROUND WATER QUALITY DISTRIBUTION MAPS

WATER QUALITY DISTRIBUTION MAPS

The data used to compile the exhibits was obtained from the U.S. Geological Survey and the U.S. Public Health Service. Descriptions of the raw data are outlined in Appendix I.

A map of equal concentration lines for each parameter would be the ideal way to represent the data if a generalized water quality picture of Alaska is desired. The amount of data, and its random spread, was not conducive to such a representation. However, five maps are presented which have ranges plotted for the following analyses: Figure 1; Total Dissolved Solids; Figure 2; Iron Content; Figure 3; Hardness; Figure 4; Alkalinity; and Figure 5; Color.

The range of concentrations plotted is quite wide, and, therefore, the data must be used only as a rough estimate for any particular location. When more than one analysis existed from a well an arithmetic average was calculated for classification purposes. No attempt was made to reflect seasonal variations, often an important consideration. For most locations where several wells were located within a few miles of one another it was assumed the waters were all obtained from the same aquifer.

Each of the above mentioned parameters was classified into five categories based partly upon the United States Public Health Service's *Drinking Water Standards* (Ref. 1) and the Federal Water Pollution Control Administration's *Water Quality Criteria* (Ref. 2). These are tabulated below for ready reference.

Permissible Water Quality Standards
by Regulatory Agencies

	<u>PHS (drinking water)</u>	<u>FWPCA (raw water)</u>
Total dissolved solids	500 ppm	500 ppm
Iron	0.3 ppm	0.3 ppm
Total hardness	--	Desired - less than 150 ppm Excessive - 300 ~ 500 ppm
Alkalinity	--	Too low - less than 30 ppm Too high - more than 500 ppm
Color	15 units	75 units

DISCUSSION OF DISTRIBUTION MAPS

Below is a brief discussion of each of the areal maps presented. When further information about an area is needed, examination of the tabular data is suggested (Exhibit II).

1) Total Dissolved Solids (Figure 1): Concentrations of total dissolved solids (TDS) in excess of 500 ppm occur frequently in the western coastal region. These values are thought to be due to sea water intrusion as the high TDS is usually associated with high chloride concentrations in the region. Inland groundwaters generally exhibit much lower TDS.

2) Iron (Figure 2): Consistently high iron content is present in the lower Kuskokwim area. Several locations along the Yukon River and its tributaries also show iron content in excess of 0.3 ppm, with one area greater than 10.01 ppm.

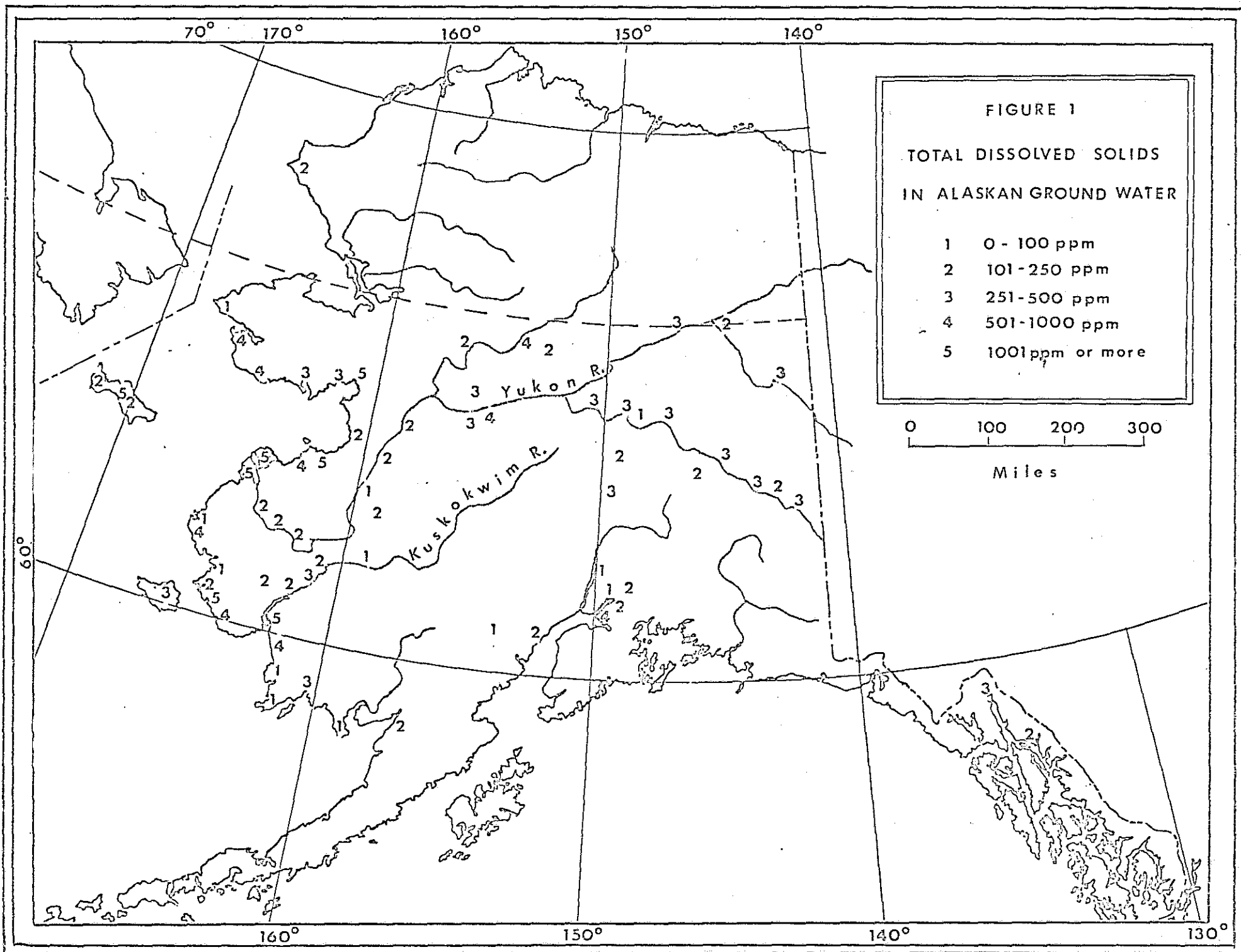
3) Total Hardness (Figure 3): Excessively hard water exists along the western coastal region, especially surrounding Norton Sound (north of the mouth of the Yukon River). When compared with TDS, it is apparent

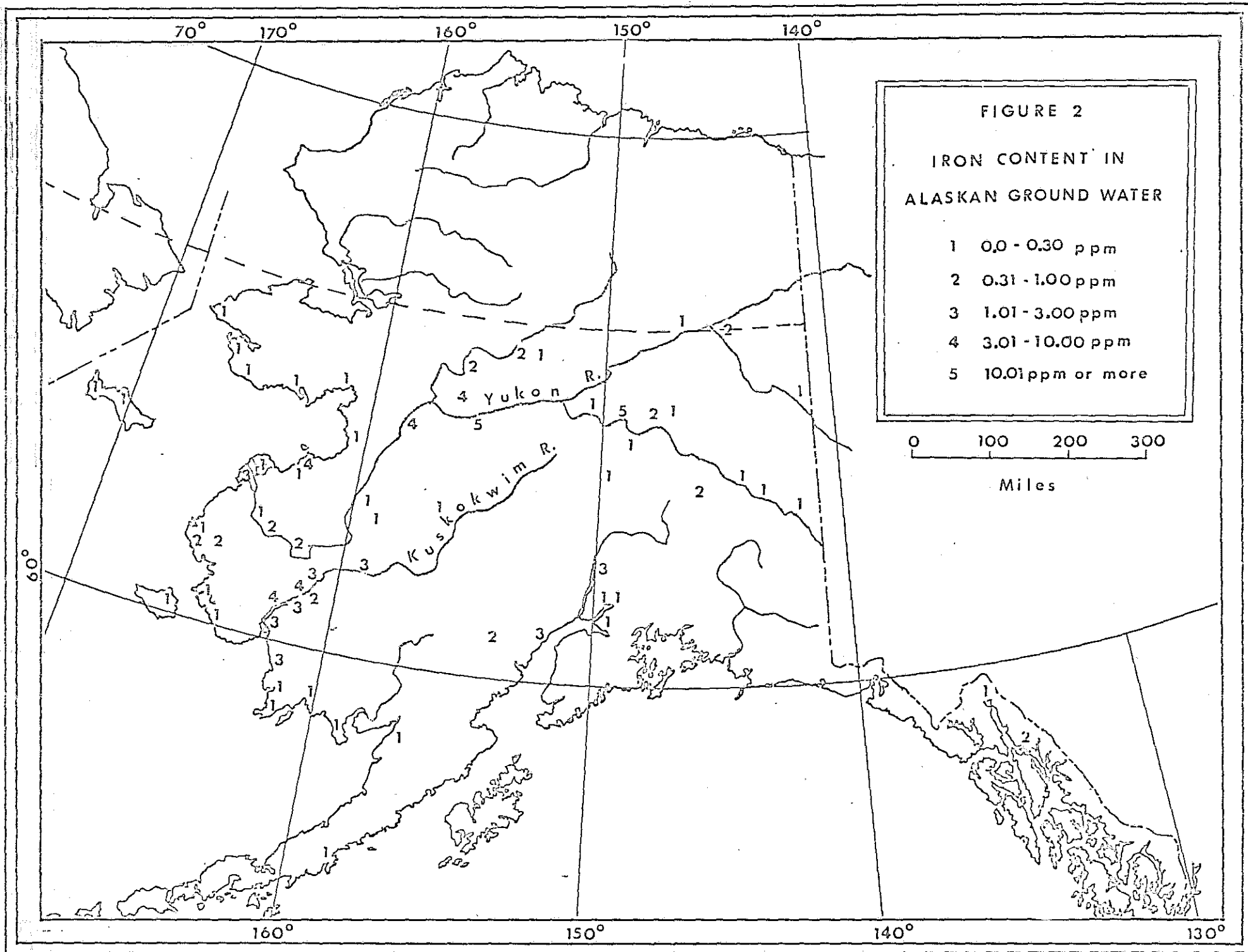
that the high values of hardness are associated with high TDS, again indicating sea water intrusion. Most of the ground waters along the Yukon River and its tributaries have hardness in excess of 150 ppm which may require softening for drinking water purposes.

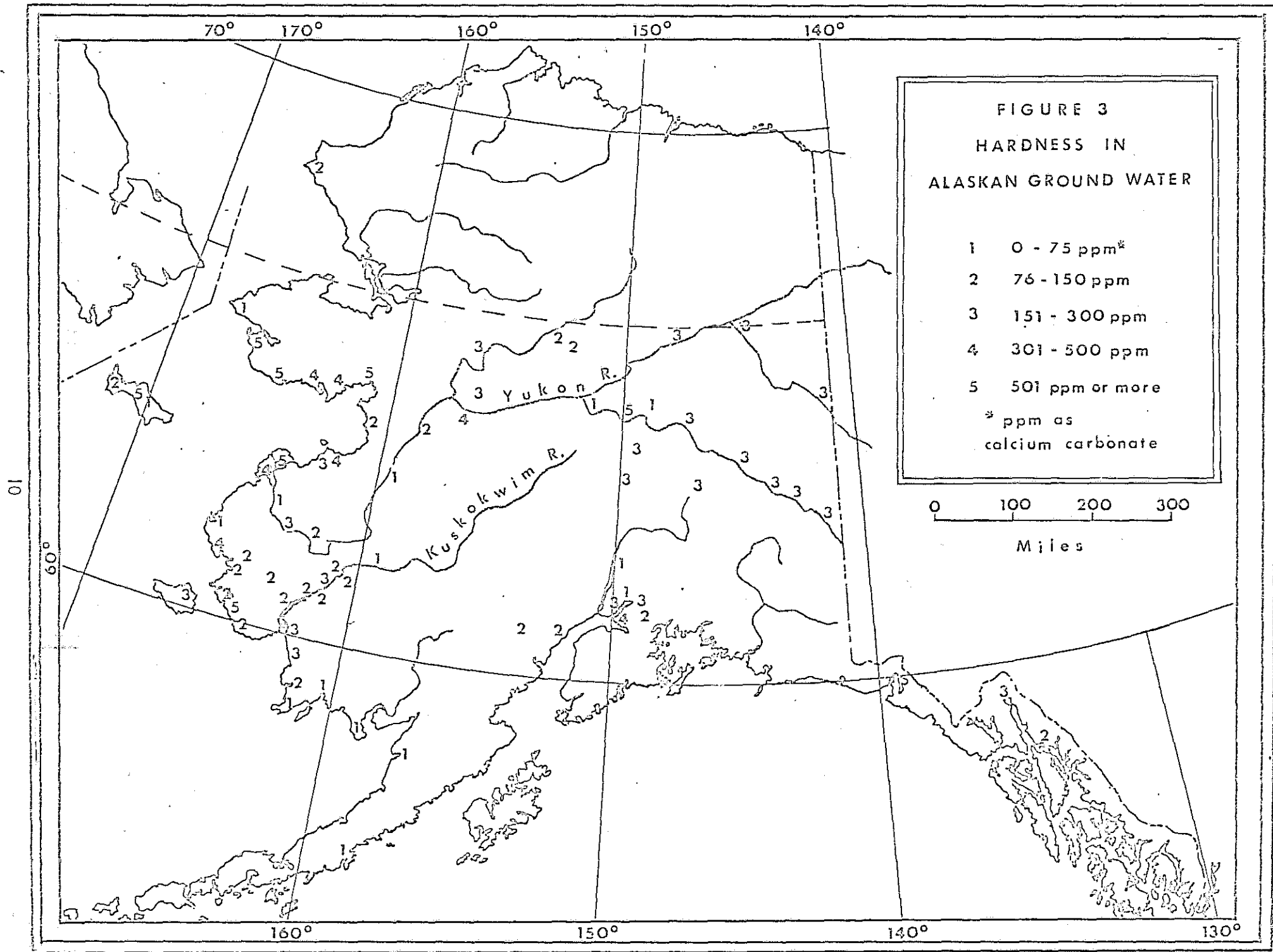
4) Alkalinity (Figure 4): This data is sparse because only USGS analyses included alkalinity and/or bicarbonate concentrations. Some of the high values in the western coastal region are probably due to sea water intrusion.

5) Color (Figure 5): The area of predominately high color content occurs at the mouths of the Yukon and Kuskokwim Rivers. Some moderately high concentrations are found throughout each of the two major rivers and their tributaries. These characteristics are quite typical of ground waters located in the flat tundra areas of northern Alaska.

Sea water intrusion is very evident along the northwestern Alaskan coast. Inland waters, although of moderate hardness and often excessive iron concentrations, are amenable to economic treatment using existing technology. Problems encountered with permafrost are evident in the northern areas of Alaska. Although ground water may indeed be existent, drilling and pumping problems are often complicated in these regions.







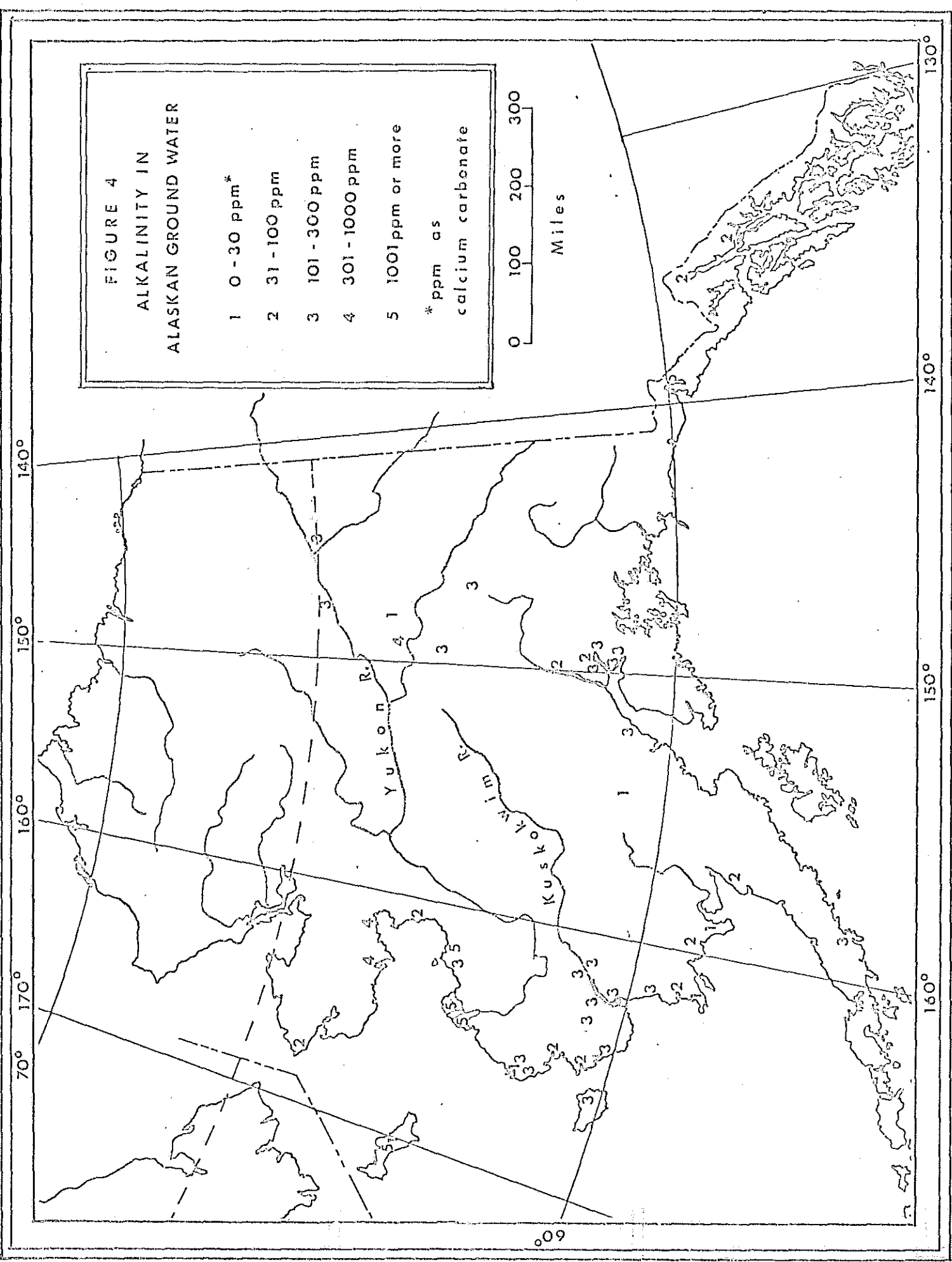


FIGURE 4
ALKALINITY IN
ALASKAN GROUND WATER

- 1 0 - 30 ppm*
- 2 31 - 100 ppm
- 3 101 - 300 ppm
- 4 301 - 1000 ppm
- 5 1001 ppm or more

* ppm as
calcium carbonate

0 100 200 300
Miles

70° 170° 160° 150° 140°

60° 160° 150° 140° 130°

YUKON R.

KUSKOKWIM R.

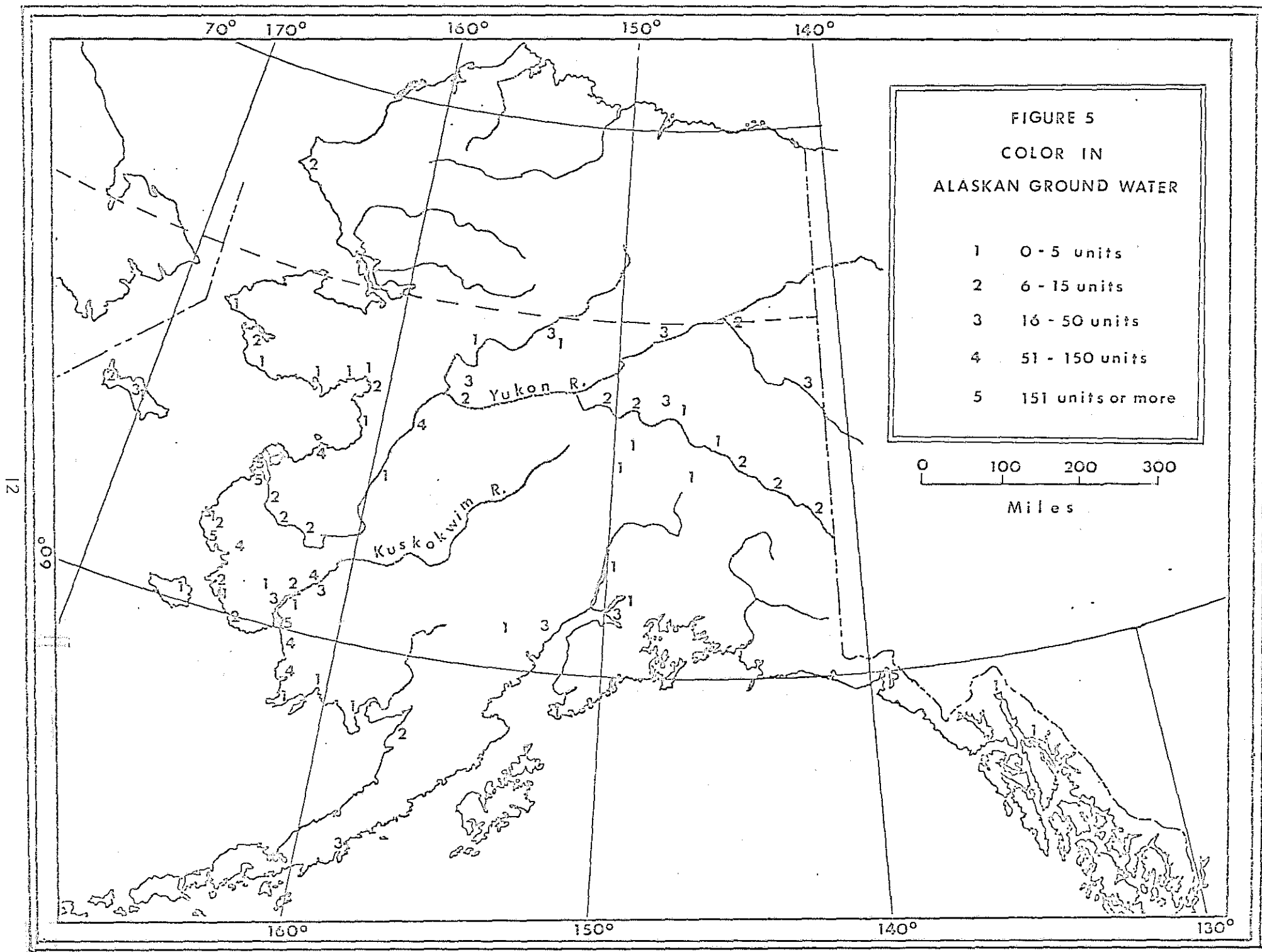


Exhibit II

TABULAR GROUND WATER QUALITY DATA

WATER QUALITY TABLES

The reader is again referred to Appendix I for a description of the source material used for the following tables.

Although by no means exhaustive, the tables do show the location by village name and latitude-longitude, date sampled, iron, chloride, total dissolved solids, hardness, alkalinity, and color for 465 analyses at 123 different locations. Place names are arranged in alphabetical order. The data are arranged in chronological order if more than one sample is listed for any one well. In some cases the samples were from different wells although the latitude and longitude are identical. The data from U.S. Public Health Service are identified with an asterisk (*) after the location name.

Headings and units used in the table are as follows:

Location:	Common geographical name of the villages or places
Latitude:	Latitude in degrees and minutes north
Longitude:	Longitude in degrees and minutes west
Mo:	Month of water sample collection
Yr:	Year of water sample collection
Iron:	Total iron concentrations in parts per million (ppm)*
Chlor:	Chloride concentration in ppm
TDS:	Total dissolved solids concentration in ppm
Hard:	Total hardness (calcium and magnesium) expressed as ppm of calcium carbonate
Alk:	Alkalinity expressed as ppm of calcium carbonate
Color:	Color intensity expressed in platinum-cobalt color units

*Note: ppm = mg/l

TABLE OF QUALITY DATA OF ALASKAN GROUND WATER

LOCATION	LAT	LONG	MO YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
AKIACHUK	* 60 59	161 25	8 60	1.00	10	140	65	N.A.	70
AKIACHUK	* 60 59	161 25	8 60	7.00	0	160	48	N.A.	70
AKIAK	* 60 55	161 13	4 58	5.00	3	330	258	N.A.	35
AKIAK	60 55	161 13	6 60	.95	10	232	179	171	30
AKIAK	* 60 55	161 13	8 60	.20	28	390	259	N.A.	50
ALAKNUK	62 41	164 37	9 62	1.60	2040	4980	415	1443	600
ANDREAFSKI	* 62 3	163 10	1 59	.05	11	100	83	N.A.	N.A.
ANDREAFSKI	* 62 3	163 10	3 58	.20	2	100	104	N.A.	10
ANDREAFSKI	* 62 3	163 10	7 58	.05	1	40	64	N.A.	40
ANDREAFSKI	* 62 3	163 10	10 58	.40	38	110	46	N.A.	10
ANDREAFSKI	* 62 3	163 10	4 59	.00	3	150	88	N.A.	10
BEAVER	66 21	147 45	6 67	.08	16	262	216	149	20
BETHEL	60 47	161 50	UNK.	.36	2	138	94	102	N.A.
BETHEL	60 46	161 43	4 54	36.00	3	N.A.	156	165	N.A.
BETHEL	60 47	161 46	6 55	2.20	3	N.A.	85	92	N.A.
BETHEL	60 48	161 43	6 55	9.90	1	N.A.	68	68	N.A.
BETHEL	60 47	161 46	11 55	6.20	3	N.A.	92	96	N.A.
BETHEL	60 46	161 43	5 56	31.00	2	N.A.	90	95	45
BETHEL	60 47	161 50	6 58	.31	3	127	98	95	N.A.
BETHEL	60 47	161 50	9 59	.13	3	148	104	112	25
BETHEL	60 47	161 50	9 59	.15	3	151	100	93	25
BETHEL	60 48	161 44	8 59	.46	3	166	108	123	45
BETHEL	60 47	161 44	8 60	3.80	5	196	127	136	50
BETHEL	60 46	162 52	9 60	1.90	3	154	107	113	30
BETHEL	60 46	162 52	12 60	.87	4	155	108	113	20
BETHEL	60 46	162 52	2 62	.05	3	147	110	112	15
BETHEL	60 47	162 53	11 62	.03	11	172	118	129	N.A.
BETHEL	60 47	162 53	1 63	.07	4	155	101	102	N.A.
BETHEL	60 47	162 53	1 63	.05	4	127	100	101	N.A.
BETHEL	60 47	162 53	1 63	39.00	4	123	105	105	10
BETHEL	60 46	162 52	2 63	2.90	4	161	110	112	N.A.
BETHEL	60 47	161 45	9 66	1.41	0	144	102	107	5
BETHEL	60 47	162 53	9 67	.26	N.A.	148	95	103	15
BETHEL	60 47	161 44	9 67	.14	13	185	124	131	15
BIG LAKE	61 33	149 52	11 63	.02	2	58	40	42	5

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
CAMPION	64 42	156 43	11	59	12.00	3	355	296	312	20
CAMPION	64 42	156 43	11	59	12.00	3	302	238	258	55
CAMPION	64 42	156 43	2	62	.12	1	328	293	302	20
CAMPION	64 42	156 43	2	62	.24	1	279	236	247	20
CAMPION	64 42	156 43	2	62	.43	3	334	75	287	20
CAMPION	64 42	156 43	2	62	.33	4	335	114	286	20
CAMPION	64 42	156 43	3	63	2.20	1	339	293	302	15
CAMPION	64 42	156 43	3	63	2.00	1	288	238	262	30
CAMPION	64 42	156 43	4	63	1.50	2	283	244	258	80
CAMPION	64 42	156 43	11	66	.09	0	272	246	254	5
CAMPION	64 42	156 43	8	67	6.72	1	362	300	315	30
CAPE NEWENHAM	58 38	162 3	9	57	.03	11	42	22	14	0
CAPE NEWENHAM	58 38	162 3	8	67	.13	8	39	15	10	5
CAPE ROMANZOF	61 47	165 57	10	58	.07	3	18	5	8	0
CAPE ROMANZOF	61 47	165 57	4	61	.07	5	25	9	9	10
CAPE ROMANZOF	61 47	165 57	7	62	.02	5	24	8	8	0
CAPE ROMANZOF	61 47	165 57	10	62	.60	5	23	11	9	5
CAPE ROMANZOF	61 46	166 3	9	63	.40	3	24	13	14	5
CAPE ROMANZOF	61 47	165 57	10	64	.08	5	20	7	6	5
CAPE ROMANZOF	61 47	165 57	11	64	.04	5	26	8	5	5
CAPE ROMANZOF	61 47	165 57	9	65	.09	6	22	6	6	10
CAPE ROMANZOF	61 47	165 57	9	67	.02	4	20	8	6	0
CHEFORNAK	60 13	164 12	10	66	.28	112	541	100	299	10
CHEVAK	61 31	165 35	5	63	.12	9	256	206	215	15
CHEVAK	61 31	165 35	5	63	1.60	8	122	68	76	110
CHIGNIK BAY	56 18	158 24	4	67	.06	53	233	29	176	20
CLEAR AFS	64 17	149 5	UNK.		.02	2	192	165	172	0
CLEAR AFS	64 17	149 9	9	63	.03	2	194	173	168	0
CLEAR AFS	64 17	149 10	9	63	.03	4	174	149	121	0
CLEAR AFS	64 17	149 10	9	63	.05	2	186	169	157	0
CLEAR AFS	64 17	149 5	9	63	.10	1	194	166	174	0
CLEAR AFS	64 17	149 5	9	63	.03	4	190	156	119	0
CLEAR AFS	64 17	149 9	11	63	.02	1	193	175	170	0
CLEAR AFS	64 17	149 10	11	63	.02	1	183	163	157	0
CLEAR AFS	64 17	149 5	11	63	.02	5	181	153	117	0
CLEAR AFS	64 17	149 9	9	64	.04	1	187	173	163	5
CLEAR AFS	64 17	149 10	9	64	.02	4	171	145	118	5

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
CLEAR AFS	64 17	149 10	9	64	.08	1	180	165	153	5
CLEAR AFS	64 17	149 5	9	64	.94	1	188	163	168	5
CLEAR AFS	64 17	149 9	7	65	.02	2	193	175	176	5
CLEAR AFS	64 17	149 10	7	65	.04	4	181	158	126	5
CLEAR AFS	64 17	149 10	7	65	.22	2	193	171	163	5
CLEAR AFS	64 17	149 5	7	65	2.30	2	197	171	181	5
CLEAR AFS	64 17	149 9	10	66	.28	0	204	180	171	0
CLEAR AFS	64 17	149 10	10	66	.07	2	187	158	128	0
CLEAR AFS	64 17	149 11	10	66	.02	2	186	154	121	0
CLEAR AFS	64 17	149 10	10	66	1.22	1	204	170	167	0
CLEAR AFS	64 17	149 5	10	66	1.00	0	197	167	181	0
CLEAR AFS	64 17	149 9	8	67	.00	0	210	186	173	0
CLEAR AFS	64 17	149 10	8	67	.00	2	191	152	119	0
CLEAR AFS	64 17	149 11	8	67	.00	0	188	161	126	0
CLEAR AFS	64 17	149 10	8	67	.36	1	192	164	155	0
CLEAR AFS	64 17	149 5	8	67	.37	0	200	169	180	0
DONNELLY FLATS	63 48	145 43	10	62	3.10	1	194	177	164	5
DONNELLY FLATS	63 43	145 43	10	62	3.30	2	211	185	167	5
DONNELLY FLATS	63 45	145 43	10	62	1.90	1	198	178	165	5
DONNELLY FLATS	63 48	145 33	10	62	1.90	1	211	190	172	5
DONNELLY FLATS	63 48	145 42	3	63	10.00	17	305	155	246	20
DONNELLY FLATS	63 48	145 43	7	65	.06	5	225	197	172	5
DONNELLY FLATS	63 43	145 43	7	65	.12	2	226	203	173	5
DONNELLY FLATS	63 43	145 43	7	65	.21	2	219	199	166	5
DONNELLY FLATS	63 48	145 33	7	65	.29	2	197	175	156	5
DONNELLY FLATS	63 48	145 42	7	65	.10	2	208	184	171	5
DONNELLY FLATS	63 49	145 43	7	65	.92	3	179	152	134	5
DONNELLY FLATS	63 48	145 43	6	66	.07	1	213	191	174	5
DONNELLY FLATS	63 43	145 43	6	66	.07	0	210	184	172	5
DONNELLY FLATS	63 43	145 43	6	66	.43	1	200	179	172	5
DONNELLY FLATS	63 48	145 33	6	66	.41	1	138	122	116	5
DONNELLY FLATS	63 48	145 42	6	66	.43	1	183	163	153	5
DONNELLY FLATS	63 49	145 43	6	66	2.09	1	177	149	134	5
DONNELLY FLATS	63 48	145 43	9	67	.04	0	229	194	177	0
DONNELLY FLATS	63 48	145 42	9	67	.06	0	225	187	176	0
DOT LAKE	* 63 39	144 4	2	61	.05	3	250	214	N.A.	5
DOT LAKE	* 63 39	144 4	5	61	.05	16	265	232	N.A.	5

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
DOT LAKE	* 63 39	144 4	7	61	.05	3	244	239	N.A.	5
EAGLE	* 68 47	141 12	5	61	.10	2	240	112	N.A.	70
EAGLE	* 68 47	141 12	8	61	.05	1	303	220	N.A.	5
EEK	60 13	162 01	10	62	1.10	640	1870	223	746	N.A.
EEK	60 13	162 01	5	67	1.06	320	1302	135	695	400
ELIM	* 64 37	162 15	3	60	.05	13	240	70	N.A.	N.A.
ELIM	* 64 37	162 15	5	60	.05	13	230	174	N.A.	N.A.
ELIM	* 64 37	162 15	10	60	.05	17	240	200	N.A.	N.A.
ELIM	64 37	162 15	2	65	.00	396	911	340	130	5
FIRE ISLAND	61 8	150 12	UNK.		.02	45	297	236	197	10
FIRE ISLAND	61 8	150 12	UNK.		.02	425	926	432	172	10
FIRE ISLAND	61 8	150 12	UNK.		.07	28	264	214	185	N.A.
FIRE ISLAND	61 8	150 12	4	61	.14	19	256	208	195	0
FIRE ISLAND	61 8	150 12	9	62	.10	38	280	218	187	5
FIRE ISLAND	61 8	150 12	4	63	.03	24	227	169	184	0
FIRE ISLAND	61 8	150 12	4	64	.03	41	279	230	192	0
FIRE ISLAND	61 8	150 12	4	64	.05	2	280	228	192	0
FIRE ISLAND	61 8	150 12	4	64	.05	193	506	366	147	0
FIRE ISLAND	61 8	150 12	4	64	.03	184	491	209	147	0
FIRE ISLAND	61 8	150 12	10	64	.02	43	278	236	185	0
FIRE ISLAND	61 8	150 12	12	64	.02	42	293	234	180	5
FIRE ISLAND	61 8	150 12	12	64	.00	57	1220	692	141	5
FIRE ISLAND	61 8	150 12	2	65	.02	656	1350	988	142	5
FIRE ISLAND	61 8	150 12	3	65	.00	266	520	252	23	5
FIRE ISLAND	61 8	150 12	3	65	.00	42	303	234	198	5
FIRE ISLAND	61 8	150 12	3	65	.02	716	510	795	157	5
FIRE ISLAND	61 8	150 12	11	65	.02	44	294	235	114	5
FIRE ISLAND	61 8	150 12	11	65	.02	828	1629	690	87	10
FIRE ISLAND	61 8	150 12	3	66	.00	44	295	240	197	10
FIRE ISLAND	61 8	150 12	3	66	.00	45	295	239	197	10
FIRE ISLAND	61 8	150 12	3	66	.00	425	945	434	166	10
FIRE ISLAND	61 8	150 12	3	66	.02	425	940	434	193	10
FIRE ISLAND	61 8	150 12	4	66	.06	250	618	149	139	10
FIRE ISLAND	61 8	150 12	4	66	.04	45	301	139	198	10
FIRE ISLAND	61 8	150 12	4	66	.00	45	296	225	199	10
FIRE ISLAND	61 8	150 12	4	66	.02	410	884	404	145	10
FIRE ISLAND	61 8	150 12	4	66	1.78	250	564	289	128	10

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
FIRE ISLAND	61 8	150 12	5	66	.00	43	299	233	199	10
FIRE ISLAND	61 8	150 12	5	66	.02	450	975	440	154	10
FIRE ISLAND	61 8	150 12	4	67	.00	98	367	194	159	5
FIRE ISLAND	61 8	150 12	4	67	.00	46	299	254	197	5
FIRE ISLAND	61 8	150 12	8	67	.08	40	305	232	193	5
FIRE ISLAND	61 8	150 12	8	67	.11	140	443	197	156	0
FORT YUKON	66 33	145 12	1	58	.00	1	201	176	158	5
FORT YUKON	66 33	145 12	11	59	.70	2	192	163	140	5
FORT YUKON	66 33	145 12	11	60	.91	1	184	158	138	5
FORT YUKON	* 66 34	145 16	3	61	.40	1	197	200	N.A.	5
FORT YUKON	* 66 34	145 16	5	61	1.00	9	214	174	N.A.	40
FORT YUKON	66 33	145 12	3	62	.02	1	174	153	136	5
FORT YUKON	66 33	145 12	3	63	.90	3	178	155	135	5
FORT YUKON	66 33	145 12	12	63	.05	4	176	151	130	25
FORT YUKON	66 33	145 12	5	64	.03	4	184	146	131	0
FORT YUKON	66 33	145 12	8	64	.70	1	175	154	132	5
FORT YUKON	66 33	145 12	8	67	.71	0	184	151	135	5
FOX	* 64 57	147 37	2	61	.20	8	295	266	N.A.	5
GALENA	64 44	156 57	10	59	2.80	3	263	226	217	20
GALENA	64 44	156 57	10	59	.07	2	267	225	218	10
GALENA	64 44	156 57	8	61	.05	1	244	208	212	10
GALENA	64 44	156 57	12	61	.03	1	268	223	223	10
GALENA	64 44	156 57	12	61	.09	1	249	218	218	10
GALENA	64 44	156 57	6	62	7.40	1	254	215	217	10
GALENA	64 44	156 57	6	62	5.50	1	261	222	221	25
GALENA	64 44	156 57	6	62	8.50	1	247	217	216	20
GALENA	64 44	156 57	2	63	10.00	1	307	236	258	25
GALENA	64 44	156 56	3	63	24.00	14	524	488	437	5
GALENA	64 44	156 57	3	63	11.00	2	251	222	224	15
GALENA	64 44	156 55	3	63	.21	14	835	788	682	5
GALENA	64 44	156 57	3	63	4.40	2	185	179	184	5
GALENA	64 44	156 57	3	63	23.00	8	501	472	454	5
GALENA	64 44	156 57	3	63	24.00	4	401	393	394	N.A.
GALENA	64 44	156 55	3	63	.07	4	689	625	541	5
GALENA	64 44	156 57	4	63	.52	21	897	870	794	5
GALENA	64 44	156 57	5	63	5.90	14	342	330	312	N.A.
GALENA	64 44	156 57	5	63	.19	42	598	590	546	N.A.

LOCATION	LAT	LONG	MO YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
GALENA	64 44	156 57	5 63	.08	39	600	590	549	N.A.
GALENA	64 44	156 57	6 63	47.00	1	246	210	216	N.A.
GALENA	64 44	156 57	6 63	4.00	1	258	218	220	N.A.
GALENA	64 44	156 57	6 63	2.30	1	259	220	218	N.A.
GALENA	64 44	156 57	6 63	38.00	8	422	406	395	N.A.
GALENA	64 44	156 57	6 63	5.40	7	371	367	364	N.A.
GALENA	64 44	156 57	7 63	4.10	1	271	229	244	N.A.
GALENA	64 44	156 57	9 63	13.00	2	254	221	219	20
GALENA	64 44	156 55	9 63	.03	1	190	169	169	5
GALENA	64 44	156 57	9 63	17.00	8	457	432	425	20
GALENA	64 44	156 57	9 63	.34	7	423	3 4	3 0	5
GALENA	64 44	156 57	9 63	.34	36	569	550	499	5
GALENA	64 44	156 57	1 65	6.76	1	260	221	221	50
GALENA	64 44	156 57	1 65	9.60	2	248	212	216	20
GAMBELL	* 63 47	171 45	10 59	.05	38	110	25	N.A.	10
GOODNEWS BAY	59 03	161 49	5 62	.07	6	101	90	92	70
GRAYLING	62 57	160 03	8 63	.05	2	52	20	26	50
GRAYLING	62 57	160 03	3 66	.02	1	54	23	25	5
GRAYLING	62 57	160 03	3 66	.02	1	55	22	25	5
HAINES	59 14	135 26	3 66	.04	5	145	112	84	0
HAINES	59 14	135 26	3 66	.00	4	421	313	76	0
HOOPER BAY	* 61 31	166 5	6 58	.40	115	750	N.A.	N.A.	10
HOOPER BAY	* 61 31	166 5	7 58	1.00	125	1080	620	N.A.	10
HOOPER BAY	61 31	166 05	4 63	1.70	17	374	48	289	100
HOOPER BAY	61 31	166 05	7 63	.86	25	262	52	181	30
HOOPER BAY	61 31	166 05	8 63	.83	21	425	48	336	400
HUGHES	* 66 3	154 15	5 61	.50	127	917	132	N.A.	25
HUSLIA	* 65 41	156 24	5 61	.40	14	209	214	N.A.	5
HUSLIA	* 65 41	156 24	7 61	.30	1	214	179	N.A.	5
INDIAN MT	65 59	153 41	11 0	.02	2	139	117	121	5
INDIAN MT	65 59	153 41	10 59	.05	2	118	102	96	0
INDIAN MT	65 59	153 41	10 59	.05	2	127	109	103	5
INDIAN MT	65 59	153 41	1 60	.03	1	120	102	98	0
INDIAN MT	65 59	153 41	1 60	.02	1	131	110	106	0
INDIAN MT	65 59	153 41	11 60	.07	5	131	110	106	0
INDIAN MT	65 59	153 41	11 60	.05	2	150	130	130	5
INDIAN MT	65 59	153 41	11 60	.24	1	128	106	112	0

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
INDIAN MT	65 59	153 41	5	61	.03	2	139	114	118	0
INDIAN MT	65 59	153 41	3	62	.03	2	142	118	119	5
INDIAN MT	65 59	153 41	3	62	.03	2	121	102	105	10
INDIAN MT	65 59	153 41	3	62	.02	1	129	110	112	5
INDIAN MT	65 59	153 41	11	64	.11	2	135	118	116	5
INDIAN MT	65 59	153 41	11	64	.20	3	132	107	110	5
INDIAN MT	65 59	153 41	9	67	.06	4	152	128	135	0
INDIAN MT	65 59	153 41	9	67	.42	2	79	118	12	0
JUNEAU	58 21	135 35	9	65	.60	1	136	98	103	5
JUNEAU	58 23	134 34	9	65	2.31	3	119	84	83	5
JUNEAU	58 23	134 33	9	65	.04	1	94	92	76	5
JUNEAU	58 21	134 35	9	65	.48	5	135	61	98	5
KALTAG	64 20	158 43	6	67	7.70	0	158	110	123	60
KASIGLOOK	60 52	162 32	UNK.		.02	44	242	101	129	5
KING SALMON	58 41	156 40	UNK.		.04	3	83	21	29	0
KING SALMON	58 40	156 27	UNK.		1.60	1	188	19	124	0
KING SALMON	58 41	156 40	UNK.		.39	19	221	65	148	10
KING SALMON	58 41	156 40	9	59	1.90	7	120	58	46	5
KING SALMON	58 41	156 40	9	59	.06	4	75	53	59	0
KING SALMON	58 41	156 40	9	59	.01	16	241	19	156	20
KING SALMON	58 41	156 39	9	59	.18	7	109	46	40	0
KING SALMON	58 41	156 39	9	59	.04	18	216	13	164	60
KING SALMON	58 41	156 39	9	59	.15	12	248	24	159	5
KING SALMON	58 41	156 40	3	62	.10	4	98	32	33	5
KING SALMON	58 41	156 40	6	62	.42	5	126	10	124	15
KING SALMON	58 41	156 40	7	62	.10	14	225	16	157	10
KING SALMON	58 41	156 39	7	62	.29	6	130	48	78	0
KING SALMON	58 41	156 39	7	62	.20	5	107	48	56	0
KING SALMON	58 41	156 40	7	62	.15	5	81	27	29	0
KING SALMON	58 41	156 40	7	62	.15	5	83	21	30	0
KING SALMON	58 41	156 39	3	63	.21	4	108	50	54	5
KING SALMON	58 41	159 39	5	63	.31	3	163	12	126	20
KING SALMON	58 41	156 40	7	64	.11	14	226	25	150	20
KING SALMON	58 41	156 40	10	64	.07	15	214	20	145	20
KING SALMON	58 41	156 40	10	64	.11	13	216	21	151	30
KING SALMON	58 41	156 39	10	64	.19	5	106	49	43	5
KING SALMON	58 41	156 40	4	65	.02	13	240	26	170	20

LOCATION	LAT	LONG	MO YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
KING SALMON	58 41	156 40	4 65	.06	13	234	19	161	25
KING SALMON	58 41	156 39	4 65	.15	4	114	50	49	10
KING SALMON	58 41	156 39	4 65	.34	6	121	55	54	10
KING SALMON	58 41	159 39	11 65	.22	2	200	10	63	10
KING SALMON	58 41	156 39	8 66	.46	5	113	52	57	5
KING SALMON	58 41	156 39	9 66	.50	4	106	5	50	5
KING SALMON	58 41	159 39	9 66	.32	1	153	8	107	5
KING SALMON	58 41	156 40	8 67	.04	4	96	24	28	0
KING SALMON	58 41	159 39	9 67	.30	N.A.	62	14	11	30
KING SALMON	58 41	156 40	10 67	.24	10	218	19	152	5
KING SALMON	58 41	156 39	10 67	.60	6	110	50	54	10
KING SALMON	58 41	156 39	10 67	.25	11	126	60	65	5
KOTLIK	63 02	163 33	4 63	.02	12040	21200	3010	1170	N.A.
KOYUK	64 56	161 09	UNK.	.02	1620	3112	849	262	5
KOYUK	64 56	161 09	UNK.	.02	290	761	366	297	5
KWETHLUK	* 69 49	161 26	4 58	16.00	17	390	210	N.A.	90
KWETHLUK	* 69 49	161 26	8 58	10.00	8	250	185	N.A.	80
KWETHLUK	* 69 49	161 26	9 58	7.00	8	140	195	N.A.	80
KWETHLUK	* 69 49	161 26	1 59	4.00	11	540	91	N.A.	N.A.
KWETHLUK	* 69 49	161 26	1 60	7.00	17	340	203	N.A.	80
KWETHLUK	60 49	161 26	2 63	.03	4	301	167	239	15
KWETHLUK	60 49	161 26	8 66	1.00	1	248	227	242	15
MCKINLEY PARK	* 63 43	148 55	2 61	.10	113	330	297	N.A.	5
MCKINLEY PARK	* 63 43	148 55	5 61	.05	3	600	320	N.A.	5
MCKINLEY PARK	* 63 43	148 55	7 61	.05	1	341	271	N.A.	5
MCKINLEY PARK	* 63 43	148 55	10 61	.10	1	349	262	N.A.	5
MANLEY H S	* 65 0	150 38	7 61	.05	65	200	63	N.A.	5
MANLEY H S	* 65 0	150 38	11 61	.05	64	254	44	N.A.	10
MANOKOTAK	58 58	159 03	1 62	.02	3	39	19	15	0
MATANUSKA VAL.	61 37	149 10	10 48	.09	3	166	130	132	N.A.
MATANUSKA VAL.	61 37	149 6	10 48	.05	3	292	219	141	N.A.
MATANUSKA VAL.	61 32	149 3	10 48	.11	5	273	228	13	N.A.
MATANUSKA VAL.	61 33	149 9	8 49	.02	8	159	140	131	N.A.
MATANUSKA VAL.	61 35	149 21	8 49	.02	65	638	530	378	N.A.
MATANUSKA VAL.	61 35	149 7	8 49	.02	74	652	490	304	N.A.
MATANUSKA VAL.	61 36	149 6	8 49	.06	42	388	269	218	N.A.
MATANUSKA VAL.	61 38	149 3	8 49	.02	8	143	104	75	N.A.

LOCATION	LAT	LONG	MO YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
MATANUSKA VAL.	61 33	149 2	8 49	.02	4	182	150	117	N.A.
MATANUSKA VAL.	61 36	149 14	8 49	7.20	7	N.A.	111	105	N.A.
MATANUSKA VAL.	61 33	149 2	7 50	.05	4	N.A.	244	159	N.A.
MATANUSKA VAL.	61 33	149 15	9 51	.02	2	191	170	159	N.A.
MATANUSKA VAL.	61 39	149 5	11 51	.02	N.A.	69	45	45	N.A.
MATANUSKA VAL.	61 38	149 3	11 53	.07	1	120	23	77	N.A.
MATANUSKA VAL.	61 43	148 54	6 55	.12	1	92	67	75	N.A.
MATANUSKA VAL.	61 43	148 53	6 55	2.40	1	70	49	52	N.A.
MATANUSKA VAL.	61 32	149 4	11 55	.09	5	197	164	121	N.A.
MATANUSKA VAL.	61 35	149 7	2 56	.00	5	203	42	169	N.A.
MATANUSKA VAL.	61 32	149 44	11 63	.02	2	56	40	42	5
MATANUSKA VAL.	61 36	149 17	8 66	.00	1	159	140	124	10
MATANUSKA VAL.	61 31	149 13	9 66	.51	2	178	144	142	5
MATANUSKA VAL.	61 34	149 26	8 67	.13	0	126	104	119	0
MATANUSKA VAL.	61 37	149 31	8 67	.12	0	172	114	156	10
MATANUSKA VAL.	61 35	149 18	8 67	.11	2	182	156	151	0
MATANUSKA VAL.	60 23	166 11	4 64	.03	52	326	197	121	5
MEKORYUK	64 53	149 11	11 61	.09	2	332	304	317	10
MINTO	64 53	149 11	12 61	.10	1	355	325	345	5
MINTO	64 53	149 11	1 62	62.00	1	456	402	429	10
MOUNTAIN VILL *	62 5	163 43	6 59	.30	27	60	80	N.A.	15
MOUNTAIN VILL	62 05	163 43	5 63	.03	21	212	77	157	10
MOUNTAIN VILL	62 05	163 43	7 63	.55	16	197	75	144	10
MURPHY DOME	64 57	148 18	2 60	2.30	1	54	38	28	0
MURPHY DOME	64 57	148 18	4 61	.10	1	44	32	23	0
MURPHY DOME	64 57	148 18	10 64	.04	2	45	29	20	5
MURPHY DOME	64 57	148 18	5 67	.00	1	4	32	22	5
MURPHY DOME	64 57	148 18	8 67	.02	0	35	24	16	0
MURPHY DOME	64 57	148 18	9 67	.00	1	32	20	18	15
NAPASKIAK *	60 41	162 7	10 60	18.00	5	240	55	N.A.	80
NEW STUYOHOK	59 29	157 20	2 62	.05	2	38	20	22	5
NEVTOK	60 56	164 38	2 64	.29	100	909	38	791	100
NIGHTMUTE	60 28	164 44	8 66	.01	7	128	90	94	N.A.
NOME *	64 30	165 25	10 59	.05	4	N.A.	130	N.A.	N.A.
NOME *	64 30	165 25	10 59	.05	157	N.A.	118	N.A.	N.A.
NOME *	64 30	165 25	7 60	5.00	2	110	120	N.A.	5
NOME *	64 30	165 25	7 60	.05	312	1130	456	N.A.	5

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALN.	COL.
NOME	* 64 30	165 25	8 60		.05	8	190	122	N.A.	5
NOME	* 64 30	165 25	8 60		.20	248	1030	436	N.A.	5
NOME	* 64 30	165 25	9 60		.05	12	290	223	N.A.	5
NOME	64 30	165 25	7 62		.03	2860	5390	1176	239	0
NORTHWAY	* 62 58	141 56	8 61		.50	2	318	247	N.A.	10
NORTHWAY	* 62 58	141 56	11 61		.10	1	269	220	N.A.	15
OSCARVILLE	* 60 43	161 46	60		9.00	1	110	68	N.A.	N.A.
OSCARVILLE	* 60 43	161 46	9 60		19.00	1	1753	78	N.A.	N.A.
OSCARVILLE	* 60 41	161 46	10 60		.50	1	110	76	N.A.	30
OSCARVILLE	60 43	161 46	3 63		1.90	3	168	122	130	N.A.
PALMER	61 36	149 14	7 66		1.94	0	161	134	138	35
PALMER	61 36	149 8	5 67		.00	5	195	51	126	5
PALMER	61 36	149 8	9 67		.00	10	181	52	126	10
PALMER	61 36	149 8	10 67		.04	6	189	48	126	5
PALMER	61 36	149 8	11 67		.04	6	190	49	126	10
PILOT STATION	* 61 56	162 52	4 58		.50	3	110	72	N.A.	10
PILOT STATION	* 61 56	162 52	6 58		.60	2	120	N.A.	N.A.	30
PILOT STATION	* 61 56	162 52	7 58		.05	1	120	69	N.A.	10
PILOT STATION	61 56	162 52	8 63		.02	2	166	129	144	0
PITKAS POINT	* 62 2	163 17	3 56		1.00	4	130	150	N.A.	10
PITKAS POINT	* 62 2	163 17	7 58		.05	3	200	127	N.A.	10
PITKAS POINT	* 62 2	163 17	10 58		.05	40	N.A.	80	N.A.	10
PITTMAN	61 35	149 15	6 50		1.50	2	N.A.	118	119	N.A.
POINT HOPE	* 68 21	166 47	8 59		.05	4	219	134	N.A.	10
POINT HOPE	* 68 21	166 47	10 60		.05	14	N.A.	45	N.A.	5
PORT GRAHAM	59 21	151 49	3 67		.00	10	118	89	84	5
QUINHAGAK	59 45	161 54	5 62		1.60	339	756	186	123	100
ST MARY	* 62 3	163 10	3 58		.40	3	130	106	N.A.	10
ST MARY	* 62 3	163 10	10 58		.40	25	40	48	N.A.	10
ST MARY	* 62 3	163 10	4 59		.02	2	148	89	N.A.	N.A.
ST MARY	62 03	163 10	4 60		.86	4	220	219	227	10
ST MICHAEL	63 29	162 02	2 66		2.90	939	3016	525	1375	65
ST MICHAEL	63 29	162 02	2 66		3.20	868	3010	449	1517	65
SAVOONGA	* 63 42	170 29	5 60		.05	16	134	43	N.A.	10
SAVOONGA	63 42	170 29	8 66		.06	4100	7700	1320	533	0
SHAGELUK	62 41	159 34	UNK.		.15	2	228	190	200	15
SHAGELUK	62 41	159 34	9 66		.30	1	213	184	200	0

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
SHELDONS POINT	62 32	164 52	8	62	.49	4200	6300	624	1381	500
SHEMYA	54 42	185 52	UNK.		.04	57	238	114	115	0
SHEMYA	52 44	185 54	7	65	.29	62	251	126	117	10
SHEMYA	52 43	185 54	7	65	.27	61	246	117	116	5
SHEMYA	54 42	185 52	7	65	.27	62	267	134	133	5
SHEMYA	52 44	185 54	12	66	.02	70	439	260	238	5
SHEMYA	52 43	185 54	12	66	.11	67	318	188	175	10
SHEMYA	52 44	185 54	7	67	.62	67	444	260	276	0
SHEMYA	52 43	185 54	7	67	.06	59	241	112	113	0
SPARREVOHN	61 6	153 38	UNK.		.05	2	85	69	40	5
SPARREVOHN	61 6	153 38	2	61	1.40	3	127	99	53	0
SPARREVOHN	61 6	153 38	2	61	.10	4	105	85	54	0
SPARREVOHN	61 6	153 38	2	61	.14	3	126	104	64	0
SPARREVOHN	61 6	153 38	3	62	7.80	1	124	102	61	0
SPARREVOHN	61 6	153 38	6	62	.03	0	112	94	68	0
SPARREVOHN	61 6	153 38	6	62	.03	1	72	61	44	0
SPARREVOHN	61 6	153 38	12	62	.03	1	118	96	65	0
SPARREVOHN	61 6	153 38	12	62	.07	2	99	78	52	0
SPARREVOHN	61 6	153 38	2	63	.00	1	N.A.	124	91	10
SPARREVOHN	61 6	153 38	7	63	.26	1	75	62	46	0
SPARREVOHN	61 6	153 38	8	63	.02	1	85	69	47	0
SPARREVOHN	61 6	153 38	12	63	.02	1	113	93	67	5
SPARREVOHN	61 6	153 38	1	64	.21	2	109	90	49	N.A.
SPARREVOHN	61 6	153 38	7	64	.15	1	114	97	66	5
SPARREVOHN	61 6	153 38	7	64	.05	3	80	63	38	5
SPARREVOHN	61 6	153 38	8	67	.06	1	79	61	44	0
SPARREVOHN	61 6	153 38	8	67	.04	0	81	64	44	0
SPARREVOHN	61 6	153 38	8	67	.10	0	79	62	44	0
SPARREVOHN	61 6	153 38	8	67	.70	55	440	N.A.	N.A.	N.A.
STEBBINS	* 63 31	162 17	9	60	.10	619	1840	122	451	450
STEBBINS	63 31	162 17	8	63	.09	307	696	59	139	110
STEBBINS	63 31	162 17	9	63	.09	0	99	58	81	5
TALKEETNA	62 10	150 11	UNK.		1.23	11	96	59	46	0
TALKEETNA	62 19	150 7	9	66	.71	6	87	52	48	0
TALKEETNA	62 19	150 6	9	66	5.43	3	84	59	63	0
TALKEETNA	62 19	150 5	9	66	.70	2	83	59	63	0
TALKEETNA	62 19	150 6	7	67	3.32	3	83	59	63	0
TALKEETNA	62 11	150 2	7	67	.13	3	55	27	28	0

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
TALKEETNA	62 8	150 3	7	67	.69	3	54	25	25	0
TALKEETNA	62 19	150 6	9	67	.10	11	96	64	55	0
TANACROSS	* 63 23	143 21	2	61	.10	4	300	203	N.A.	5
TANACROSS	* 63 23	143 21	5	61	.05	36	287	224	N.A.	5
TANACROSS	* 63 23	143 21	8	61	.10	1	281	212	N.A.	5
TANACROSS	* 63 23	143 21	10	61	.10	4	420	190	N.A.	10
TATALINA	62 54	156 0	11	58	.02	3	67	46	33	0
TATALINA	62 54	156 0	12	59	.07	1	71	48	38	0
TATALINA	62 54	156 0	2	61	.05	2	80	60	44	0
TATALINA	62 54	156 0	2	63	.03	2	77	55	40	0
TATALINA	62 54	156 0	12	63	.02	1	71	50	39	5
TATALINA	62 54	156 0	8	64	.03	2	69	51	35	5
TATALINA	62 54	156 0	8	67	.00	N.A.	62	42	32	5
TELLER	* 65 16	166 22	11	59	.30	112	290	110	N.A.	10
TELLER	* 65 16	166 22	11	59	.05	212	540	189	N.A.	20
TELLER	* 65 16	166 22	11	59	.05	212	540	189	N.A.	10
TELLER	* 65 16	166 22	1	60	.05	132	360	115	N.A.	20
TELLER	* 65 16	166 22	1	60	.05	772	1570	465	N.A.	10
TELLER	* 65 16	166 22	5	60	.05	214	561	172	N.A.	10
TELLER	* 65 16	166 22	5	60	.05	502	1395	453	N.A.	10
TETLIN	* 63 8	142 31	2	61	.05	1	190	158	N.A.	10
TETLIN	* 63 8	142 31	5	61	.20	6	214	168	N.A.	5
TETLIN	* 63 8	142 31	9	61	.10	1	170	123	N.A.	5
TETLIN	* 63 8	142 31	12	61	.20	1	171	166	N.A.	5
TIN CITY	65 34	167 58	9	57	.03	14	63	40	23	0
TIN CITY	65 34	167 58	9	57	.02	12	64	40	27	0
TIN CITY	65 35	167 68	2	58	.00	7	54	32	28	5
TIN CITY	65 35	167 68	2	58	.00	13	75	50	28	0
TIN CITY	65 34	167 58	8	59	.57	8	50	30	24	5
TIN CITY	65 34	167 58	11	59	.34	11	54	36	28	N.A.
TIN CITY	65 34	167 58	6	61	.17	17	72	46	34	0
TIN CITY	65 34	167 58	6	61	.20	16	60	36	22	0
TIN CITY	65 35	167 68	1	62	.14	10	77	49	35	10
TIN CITY	65 35	167 68	1	62	.02	11	76	48	32	0
TIN CITY	65 35	167 68	2	62	.02	16	105	70	34	0
TIN CITY	65 34	167 58	4	62	.02	25	150	103	43	5
TIN CITY	65 35	167 68	4	62	.02	21	131	94	43	0

LOCATION	LAT	LONG	MO	YR	IRON	CHLOR.	TDS	HARD.	ALK.	COL.
TIN CITY	65 35	167 68	5	62	.02	21	154	103	46	0
TIN CITY	65 35	167 68	6	62	.02	11	83	54	45	5
TIN CITY	65 35	167 68	7	62	.03	10	62	39	32	5
TIN CITY	65 35	167 68	4	63	.15	13	88	60	34	5
TIN CITY	65 35	167 68	5	63	.02	11	62	43	39	0
TIN CITY	65 34	167 58	9	63	.02	10	50	29	22	0
TIN CITY	65 35	167 68	8	64	.17	7	48	29	20	5
TIN CITY	65 35	167 68	9	65	.24	7	40	28	24	0
TOGIAK	59 04	160 24	12	61	.05	111	286	63	54	5
TOKSOOK BAY	60 31	105 15	7	66	.04	11	138	116	113	10
TULUKSAK	* 61 6	160 58	8	58	.30	55	90	103	N.A.	10
TULUKSAK	* 61 6	160 58	9	58	.10	29	90	96	N.A.	10
TULUKSAK	* 61 6	160 58	7	60	3.00	2	610	43	N.A.	70
TUNUNAK	60 37	165 17	12	63	.05	15	97	42	57	N.A.
TYONEK	61	151 8	7	65	1.31	6	111	64	67	80
TYONEK	61 53	150	7	67	1.01	1	153	119	133	0
TYONEK	61 44	150 2	7	67	7.00	1	177	136	148	0
UNALAKLEET	* 63 52	160 47	7	60	.0	4	90	87	N.A.	10
UNALAKLEET	* 63 52	160 47	10	60	1.00	1	120	26	N.A.	15
UNALAKLEET	* 63 54	160 35	12	62	.00	30	130	100	N.A.	N.A.
UNALAKLEET	63 54	160 44	1	63	.26	4	97	82	N.A.	10
UNALAKLEET	63 54	160 44	1	63	.02	3	114	98	95	10
UNALAKLEET	63 54	160 35	3	63	.36	4	95	82	71	10
UNALAKLEET	63 54	160 44	1	64	.40	3	111	94	96	5
UNALAKLEET	63 54	160 35	4	64	.19	4	89	77	70	0
UNALAKLEET	63 54	160 44	8	64	.05	3	104	89	82	5
UNALAKLEET	63 54	160 35	10	64	.22	5	101	89	69	5
UNALAKLEET	61 34	149 26	11	55	.02	2	N.A.	112	111	N.A.
WASILLA	61 34	149 26	8	66	.08	1	141	113	78	5
WASILLA	61 34	149 26	8	67	.12	7	209	170	135	0
WASILLA	61 34	149 26	8	67	.13	0	126	104	119	0
WASILLA	61 37	149 31	8	67	.12	0	172	114	156	10
WHITE MOUNTAIN	69 41	163 24	5	64	.03	37	420	364	393	0

Appendix I

SOURCES OF INFORMATION

SOURCES OF INFORMATION

U.S. Geological Survey

Extensive data on ground water in Alaska has been collected by the USGS since 1948. The raw data cover the following information:

Well Description

Identification	Year drilled
Date of sample	Water level
Well number	Yield
Latitude (degree, minute, second)	Draw down
Longitude (degree, minute, second)	Water temperature
Depth of well	
Diameter of well	

Water Quality Information

Date of analysis	Chloride
Silicate	Fluoride
Dissolved Iron	Nitrate
Total Iron	Carbon dioxide
Manganese	Total dissolved solids
Calcium	Total hardness
Magnesium	Carbonate hardness
Sodium	Alkalinity
Potassium	Conductivity
Bicarbonate	pH
Carbonate	Color
Sulfate	

For the presentation in this report only a few parameters were extracted from the original data. The following considerations were given in this process of data extraction:

Iron Concentration

Iron concentration used herein represents total iron, including both dissolved and undissolved. When only dissolved iron concentration was reported in the original data it was presented in this report as total iron.

Alkalinity

Alkalinity data were missing in much of the original data, necessitating it to be calculated from bicarbonate concentration. This may be justifiable in view of the fact that most water samples showed a pH of 6 to 8, in which range most natural alkalinity is in the form of bicarbonate.

Chloride

The concentration of chloride ion was expressed to the 0.1 ppm in the raw data. It was rounded to the nearest whole number for this report.

Public Health Service

The water quality data in remote villages in Alaska collected by Arnow and Hubbs (Ref. 3) were the source of information. Their study was made between 1959 and 1961 and covered both surface and ground waters. Even though the information was not as extensive as that from USGS, it covered many locations not reported by USGS information.

This data covers the following information:

Village name	Odor
Date of sampling	pH
Origin (river, well, or spring)	Iron
Iron	Calcium
Total Solid (total dissolved solid)	Magnesium
Organic matter	Sodium
Hardness	Chloride
Conductivity	Fluoride
Color	Nitrate

Only data from the wells and springs are presented from this source. Alkalinity data were not available. The latitude and longitude of each village were obtained from the *Dictionary of Alaska Place Names* (Ref. 4).

Appendix II

REFERENCES

REFERENCES

1. *Drinking Water Standards, 1962*, Public Health Service, U.S. Department of Health, Education and Welfare.
2. *Report of the Committee on Water Quality Criteria*, Federal Water Pollution Control Administration, U.S. Department of the Interior (April, 1968).
3. *Characteristics of Surface and Ground Waters in Selected Villages of Alaska, Part I and Part II*, Arnow, G.M., and Hubbs, G.L., Environmental Sanitation Section, Arctic Health Research Center, Anchorage, Alaska, Department of Health, Education and Welfare.
4. *Dictionary of Alaska Place Names*, Orth, D.J., Geological Survey Prof. Paper 907.