WATER QUALITY

Water quality in the Potter Creek area has not been thoroughly studied, and available data on water quality are sparse. This is especially true with regard to ground water. Nevertheless, some data have been collected, and some preliminary conclusions can be drawn:

- The quality of surface water in the Potter Creek area is very good, based on the limited information now available; it is suitable for recreational use.
- Ground-water quality in the Potter Creek area, again, based on limited available data, is good; it is generally suitable for use as a domestic water supply.
- Water from some wells may benefit from treatment to reduce iron and manganese concentrations or to reduce hardness.

Although water quality in the Potter Creek area is now good, the quality could be degraded if future development is improperly undertaken. Steps taken in planning and carrying out road and home construction in the area can help maintain the presently high quality of water resources in the Potter Creek area. Use of setbacks and greenbelts in critical areas might be one way to reduce the impact of development on surface water. Subdivision plans that minimize the number of places streams are crossed by roads can also protect water quality. Where roads do cross streams, use of bridges instead of culverts buried in unstable embankments could reduce sediment loads contributed to streams. In addition, the density, design, installation, and maintenance of domestic waste-disposal systems, as well as of sewer lines, can have an important effect on both ground- and surface-water quality.

Ground Water

The locations of four domestic-supply wells, each of which was sampled once to determine the quality of water, are shown in figure 12. The results of these water-quality analyses are shown in table 2.

The predominant ions in ground water in the Potter Creek area are calcium and bicarbonate. The water sampled was moderately hard (84-100 milligrams per liter [mg/L] as $CaCO_3$); however, water samples from five nearby wells in similar geologic settings had hardness values exceeding 120 mg/L as $CaCO_3$ (Dearborn and Barnwell, 1975). When hardness as $CaCO_3$ is 100 mg/L or more, water softening units may be desired to produce water more suitable for domestic use (Hem, 1970).

Iron concentrations in water from the four wells are less than the recommended maximum of 300 micrograms per liter (µg/L) for drinking water set by the U.S. Environmental Protection Agency (1976). Values as high as 3,100 µg/L were reported for wells in similar geologic materials elsewhere in the Hillside area (Dearborn and Barnwell, 1975).

Manganese concentration slightly exceeds the recommended limit of 50 µg/L (U.S. Environmental Protection Agency, 1976) in water from one of the four wells sampled. Both iron and manganese concentrations can be reduced to acceptable levels by water treatment units designed for use with domestic water supplies.

The concentrations of all other constituents analyzed are within recommended limits, and they appear to be typical of ground-water quality throughout the Hillside area.

Surface Water

Surface-water quality data were collected in October 1979 and March 1980 at four sites on Little Rabbit Creek and two sites on Potter Creek; streamflow measurements were also made at a third Potter Creek site. (See figure 2 for locations.) These data are presented in table 3. Miscellaneous water-quality and streamflow data (table 4) were collected on Little Rabbit Creek from July 1961 through April 1973 at a site just above the Old Seward Highway. A recording streamgage was operated on Little Rabbit Creek about 300 ft below the Old Seward Highway from May 1979 until September 1980. At the streamgage site, field data for as many as seven water-quality characteristics were collected on 15 occasions from June 1979 through June 1980 (table 5). In September 1980, the recording streamgage was relocated about 1.8 mi upstream to a more stable reach of Little Rabbit Creek. The gage is still (December 1981) in operation at that site.

Except for some of the data in table 5, the available water-quality data for the Potter Creek study area represent stream water quality under low streamflow conditions when ground-water contribution is a significant portion of the flow. During periods of higher flow when surface runoff dilutes ground-water inflow, dissolved chemical constituents generally occur in lower concentrations while constituents associated with suspended materials generally occur in higher concentrations.

All available water-quality data from the Potter Creek study area show that the predominant ions in the surface water are calcium and bicarbonate and that the water is of uniformly high quality. Hardness is less than that of the area's ground water and ranges from 44 to 83 mg/L as $CaCO_3$. These concentrations indicate soft to moderately hard water suitable for most domestic purposes (Hem, 1970). Concentrations of all other chemical constituents were well within normal ranges and recommended limits for drinking water (U.S. Environmental Protection Agency, 1976) when sampled. Stream waters were well oxygenated, having dissolved-oxygen concentrations at or near saturation. Stream temperatures ranged from 0°C in the winter to about 10°C in summer.

Ten of 15 fecal coliform samples showed very low numbers of organisms (2 to 11 colonies per 100 ml of sample); the other five samples developed no colonies (reported as less than 1 colony per 100 ml). Thus, the streams met State of Alaska standards for Class A (drinking) waters at the times they were sampled. During periods of high flow, when overland runoff contributes most of the streamflow as well as significant suspended material, the fecal coliform levels may be significantly higher.

In future investigations in the Potter Creek area, it may be preferable to measure fewer water-quality characteristics and to estimate others, if reliable estimates can be made. To examine this possibility, statistical methods were used to study the relationships among the water-quality characteristics measured in the Potter Creek area. Certain characteristics studied appear to be closely correlated with others, so that the value of one may be used to reliably estimate the value of another. In order to test such correlations, linear regression analysis was used (Ezekiel and Fox, 1959).

In linear regression analysis, a linear equation is proposed for estimating the value of an "unknown" dependent variable, given the known value of an independent variable. The proposed equation is tested by comparing the values it "predicts" with those observed. A "coefficient of determination" is computed which is a measure of the agreement between predicted and observed values, or the correlation. The coefficient of determination ranges from 0 to 1, with 1 representing a perfect correlation. The standard error of estimate may also be computed; this is the value, or magnitude, in whatever units used, of one standard deviation from the value estimated by the correlation equations. For more detailed discussion of regression analysis and standard error of estimate, see Hardyck and Petrinovich (1969) and Ezekiel and Fox (1959).

Data sets from analyses of 17 surface-water samples, (tables 3 and 4) were subjected to linear regression analysis to define correlations among selected chemical constituents. All samples represent surface water under low-flow conditions. Six chemical characteristics yielded coefficients of determination of 0.50 or more when tested for correlation with field-measured specific conductance. Table 6 presents the results of this statistical analysis; the equations correlating the variables are given, along with their coefficients of determination and standard errors of estimate.

Two chemically related water-quality characteristics, hardness and bicarbonate ion concentration, show especially good correlation with field-measured specific conductance: their coefficients of determination are 0.95 and 0.96 respectively. Figure 13 is a graph of specific conductance versus hardness; also plotted is the linear equation correlating the two variables. Owing to the good correlation between specific conductance and hardness, a reliable estimate of hardness of surface water in the Potter Creek area under low-flow conditions can be based on a simple specific conductance measurement. Comprehensive collection in area creeks of water-quality data throughout the range of flows observed would be needed to determine chemical and physical relationships under conditions of other than low flow.

A more comprehensive set of water-quality data is available for the streamgage site near the mouth of Little Rabbit Creek (table 5). Statistical analysis of these data shows significant correlation between streamflow and specific conductance, and between streamflow and alkalinity; coefficients of determination are 0.72 and 0.92 respectively. Figure 14 is a graph of both specific conductance and alkalinity versus streamflow.

The correlation equations show that both specific conductance and alkalinity decrease as streamflow increases. Specific conductance and alkalinity reflect the concentration of dissolved solids in the stream water, and when streamflow is high, overland runoff dilutes the more mineralized ground-water inflow.

Table 2. -- Water-quality data from four ground-water samples from wells in Potter Creek and Little Rabbit Creek basins [Sites shown in figure 12. Results in milligrams per liter except as indicated.]

Section, map number, and aquifer lithology*	Date of sample	Time	Temperature (°C)	Specific conductance (µmhos)	pH (units)	Carbon dioxide (CO_2)	Alkalinity ($CaCO_3$)	Bicarbonate (HCO_3)	Nitrogen NO_2+NO_3 (N)	Phosphorus (P)	Hardness ($CaCO_3$)	Hardness noncarbonate ($CaCO_3$)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Chloride (Cl)	Sulfate (SO_4)	Fluoride (F)	Silica (SiO_2)	Arsenic (µg/L) (As)	Copper (µg/L) (Cu)	Lead (µg/L) (Pb)	Iron (µg/L) (Fe)	Manganese (µg/L) (Mn)	Solids, residue (180 °C)	Solids, sum of constituents
11 3 B	04/29/80	1800	3.5	193	7.3	7.3	75	100	0.05	0.02	85	10	26	4.8	3.7	0.3	0.5	15	0.1	11	1	0	0	80	70	119	107
11 9 U	04/03/80	1330	5.0	205	6.8	25	82	100	0.81	0.01	100	18	32	4.8	3.3	0.3	1.4	16	0.1	12	0	33	0	<10	<1	126	123
3 7 B	04/03/80	1200	5.5	180	6.4	54	70	85	1.3	0.01	84	15	27	4.1	3.3	0.5	2.5	16	0.0	12	1	110	1	20	<1	118	113
1 3 U	04/29/80	1400	7.0	231	7.6	4.1	83	91	2.5	0.00	100	20	35	3.8	2.4	0.0	1.2	14	0.1	11	1	50	0	<10	5	134	129

*B - Bedrock
U - Unconsolidated sediments

Table 3. -- Water-quality and streamflow data from surface-water sites in Potter Creek and Little Rabbit Creek basins under low flow conditions. [Sites shown in figure 2. Results in milligrams per liter except as indicated.]

Site number and name	Date	Time	Streamflow, instantaneous (ft³/s)	Temperature (°C)	Specific conductance (µmhos)	pH (units)	Color (platinum-cobalt units)	Coliform, fecal, 0.7 UM-MF (cols./100 ml)	Sediment, suspended	Sediment, discharge, suspended (ton/day)	Dissolved constituents: Oxygen	Oxygen (per cent saturation)	Carbon dioxide (CO_2)	Alkalinity ($CaCO_3$)	Bicarbonate (HCO_3)	Nitrogen (N)	Nitrogen, organic (N)	Nitrogen, ammonia (N)	Nitrogen, ammonia + organic (N)	Nitrogen, NO_2+NO_3 (N)
1. Potter Creek (upper)	10/24/79	1300	1.3	1.0	120	7.3	5	*K4	2	0.01	13.3	100	3.9	39	48	1.4	0.56	0.01	0.57	0.79
	03/25/80	1130	0.52	0.5	125	6.9	5	1	--	--	13.7	100	11	43	53	1.4	0.38	0.02	0.40	1.0
2. Potter Creek at Potter Ravine	10/79	1530	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	03/80	1500	0.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Potter Creek at Potter	10/24/79	1430	2.2	1.5	140	7.3	5	*K4	2	0.01	13.7	100	4.9	50	61	1.8	0.67	0.00	0.67	1.1
	03/25/80	1400	0.78	1.0	160	7.3	5	1	--	--	14.1	100	6.2	63	77	1.9	0.49	0.02	0.51	1.4
4. Little Rabbit Creek at Nickleen Drive	10/25/79	1045	2.3	2.0	100	6.7	5	*K5	1	0.01	13.0	99	13	34	41	1.0	0.56	0.01	0.57	0.45
	03/26/80	1045	1.0	0.5	135	7.1	5	1	--	--	13.6	99	7.5	48	59	1.1	0.51	0.02	0.53	0.59
5. Little Rabbit Creek tributary	10/25/79	1130	0.77	2.0	150	6.8	5	*K2	3	0.01	13.2	101	18	59	72	1.9	0.94	0.02	0.96	0.97
	03/26/80	1545	0.17	0.0	165	7.5	5	1	--	--	13.7	99	4.0	65	79	2.0	1.0	0.06	1.1	0.90
6. Little Rabbit Creek at Goldenview Drive	10/25/79	1245	3.4	2.0	123	6.9	0	*K4	2	0.02	13.5	102	11	44	54	1.2	0.62	0.00	0.62	0.54
	03/26/80	1215	2.1	0.5	150	7.2	5	1	--	--	14.0	100	7.0	57	69	1.0	0.35	0.02	0.37	0.63
7. Little Rabbit Creek near Old Seward Highway	10/25/79	1430	3.9	2.5	130	6.8	5	*K2	2	0.02	13.2	100	15	48	59	1.4	0.79	0.01	0.80	0.58
	03/26/80	1500	2.1	0.5	155	7.5	30	*K2	--	--	14.0	--	3.5	57	70	0.98	0.29	0.04	0.33	0.65

Site number and name	Date	Time	Dissolved constituents: Phosphorus (P)	Hardness ($CaCO_3$)	Hardness noncarbonate ($CaCO_3$)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Chloride (Cl)	Sulfate (SO_4)	Fluoride (F)	Silica (SiO_2)	Iron (µg/L) (Fe)	Manganese (µg/L) (Mn)	Arsenic (µg/L) (As)	Lead (µg/L) (Pb)	Solids, residue (180 °C)	Solids, sum of constituents
1. Potter Creek (upper)	10/24/79	1300	0.00	52	13	17	2.4	1.5	0.2	0.8	19	0.0	8.0	30	1	2	0	81	76
	03/25/80	1130	0.01	60	16	19	3.0	2.1	0.3	0.5	15	0.0	10	20	1	1	0	78	80
2. Potter Creek at Potter Ravine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Potter Creek at Potter	10/24/79	1430	0.00	66	16	21	3.2	2.1	0.3	0.9	17	0.1	8.9	20	1	1	0	74	88
	03/25/80	1400	0.01	82	19	26	4.2	3.4	0.4	0.8	13	0.1	11	10	1	1	0	99	103
4. Little Rabbit Creek at Nickleen Drive	10/25/79	1045	0.01	44	11	14	2.3	1.6	0.2	0.7	14	0.0	8.0	20	2	1	0	47	63
	03/26/80	1045	0.01	64	16	20	3.4	2.6	0.3	0.8	15	0.1	10	10	1	1	0	69	84
5. Little Rabbit Creek tributary	10/25/79	1130	0.00	67	8	20	4.1	1.9	0.2	1.7	15	0.0	8.6	30	10	1	0	85	91
	03/26/80	1545	0.01	83	19	24	5.7	2.4	0.3	2.6	13	0.1	10	30	6	1	0	96	101
6. Little Rabbit Creek at Goldenview Drive	10/25/79	1245	0.00	52	8	16	2.9	1.9	0.2	1.1	15	0.0	8.7	40	4	2	0	83	75
	03/26/80	1215	0.01	72	15	22	4.1	2.8	0.3	1.3	14	0.1	11	20	1	1	0	90	92
7. Little Rabbit Creek near Old Seward Highway	10/25/79	1430	0.00	58	9	18	3.1	2.1	0.2	1.5	16	0.0	8.9	20	2	1	0	74	81
	03/26/80	1500	0.01	74	17	23	4.1	3.0	0.4	2.4	15	0.3	11	20	1	0	0	99	97

*K - non-ideal colony count

Table 4.-- Water-quality data for Little Rabbit Creek at Anchorage (near Old Seward Highway) from 1961-1973 [Site 7 shown in figure 2. Results in milligrams per liter except as noted.]

Date	Time	Streamflow, instantaneous (ft³/s)	Temperature (°C)	Specific conductance (µmhos)	pH (units)	Carbon dioxide dissolved (CO_2)	Alkalinity ($CaCO_3$)	Bicarbonate (HCO_3)	Color (platinum-cobalt units)	Nitrogen, organic total (N)	Nitrogen, ammonia total (N)	Nitrogen, ammonia + organic total (N)
07/28/61	1230	--	14.0	115	7.6	2.3	46	56	10	--	--	--
10/31/66	--	--	--	124	7.5	2.7	43	53	--	--	--	--
05/15/67	--	2.1	5.0	95	7.1	5.1	33	40	10	--	--	--
04/06/72	1430	1.2	0.0	162	7.8	2.0	64	78	0	--	--	--
04/10/73	1245	--	0.0	151	7.6	3.0	62	75	6	0.14	0.00	0.14

Date	Dissolved constituents: Nitrogen, nitrate (N)	Nitrogen, NO_2+NO_3 (N)	Phosphorus, total (P)	Phosphorus, ortho (P)	Hardness ($CaCO_3$)	Hardness, noncarbonate ($CaCO_3$)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Chloride (Cl)	Sulfate (SO_4)
07/27/61	0.20	--	--	--	55	9	20	1.2	1.7	0.4	1.0	12
10/31/66	0.27	--	--	--	60	17	17	4.3	1.2	0.1	0.0	17
05/15/67	1.0	--	--	--	45	12	14	2.5	1.7	0.5	0.0	12
04/06/72	0.41	--	--	--	79	25	25	4.1	2.7	0.3	0.8	16
04/10/73	--	0.53	0.02	0.00	73	17	25	3.8	2.8	0.6	2.8	17

Date	Dissolved constituents: Fluoride (F)	Silica (SiO_2)	Iron (µg/L) (Fe)	Iron (µg/L) (Fe)*	Manganese (µg/L) (Mn)	Manganese (µg/L) (Mn)*	Cadmium (µg/L) (Cd)	Copper (µg/L) (Cu)	Lead (µg/L) (Pb)	Zinc (µg/L) (Zn)	Solids, sum of constituents
07/28/61	0.1	9.7	--	30	--	30	--	--	--	--	75
10/31/66	0.1	8.9	--	1510	--	--	--	--	--	--	77
05/15/67	0.5	8.3	--	790	--	--	--	--	--	--	64
04/06/72	0.1	10	50	--	10	--	--	--	--	--	99
04/10/73	0.1	9.6	30	--	20	--	0	6	2	10	101

*Analytical methodology undetermined

Table 5. -- Field water-quality data for Little Rabbit Creek at Anchorage (near the Old Seward Highway) from 1979 to 1980. [Site 7 shown on figure 2. Results in milligrams per liter except as indicated.]

Date	Time	Streamflow, instantaneous (ft³/s)	Temperature (°C)	Specific conductance (µmhos)	pH (units)	Alkalinity ($CaCO_3$)	Bicarbonate (HCO_3)	Oxygen, dissolved	Oxygen, dissolved (percent saturation)	Coliform, fecal, 0.7 UM-MF (cols./100 Ml)
06/26/79	1500	16	7.0	95	--	--	--	--	--	--
06/27/79	1400	31	7.0	93	--	--	--	--	--	--
08/09/79	0930	6.2	9.0	130	7.2	45	55	--	--	--
09/11/79	1430	2.7	8.0	140	6.8	54	66	11.9	100	--
10/25/79	1430	3.9	2.5	130	6.8	48	59	13.2	100	*K2
11/28/79	1400	20	0.5	115	7.2	32	39	13.8	97	--
01/04/80	1330	4.1	0.5	140	6.9	49	60	14.7	100	--
02/11/80	1100	7.3	0.5	140	6.8	46	56	14.1	97	--
03/26/80	1500	2.1	0.5	155	7.5	57	70	14.0	--	*K2
04/18/80	1500	8.1	3.0	145	7.5	48	58	13.2	100	--
04/28/80	1330	9.2	5.0	125	--	--	--	--	--	--
05/19/80	1245	16	6.5	110	7.4	33	40	--	--	--
05/20/80	1530	16	--	--	--	--	--	--	--	*K11
05/29/80	1500	14	6.5	110	7.4	33	40	12.6	102	--
05/30/80	1330	25	5.0	108	--	--	--	--	--	--
06/18/80	1530	19	6.5	90	7.4	30	36	--	--	--

*K - non-ideal colony count

CONVERSION TABLE

Multiply	by	To obtain
foot (ft)	0.3048	meter (m)
cubic feet per second (ft³/s)	28.32	liters per second (L/s)
gallons per minute (gal/min)	0.063	liters per second (L/s)
degrees Fahrenheit (°F)	(°F-32)/1.8	degrees Celsius (°C)

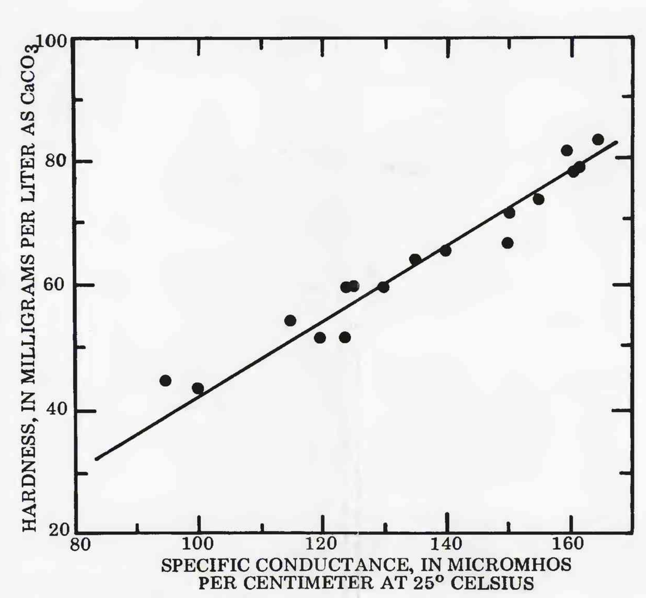

Figure 13. -- Relationship between specific conductance and hardness under low-flow conditions at six surface-water sites in the Potter and Little Rabbit Creek basins. (See table 3.)

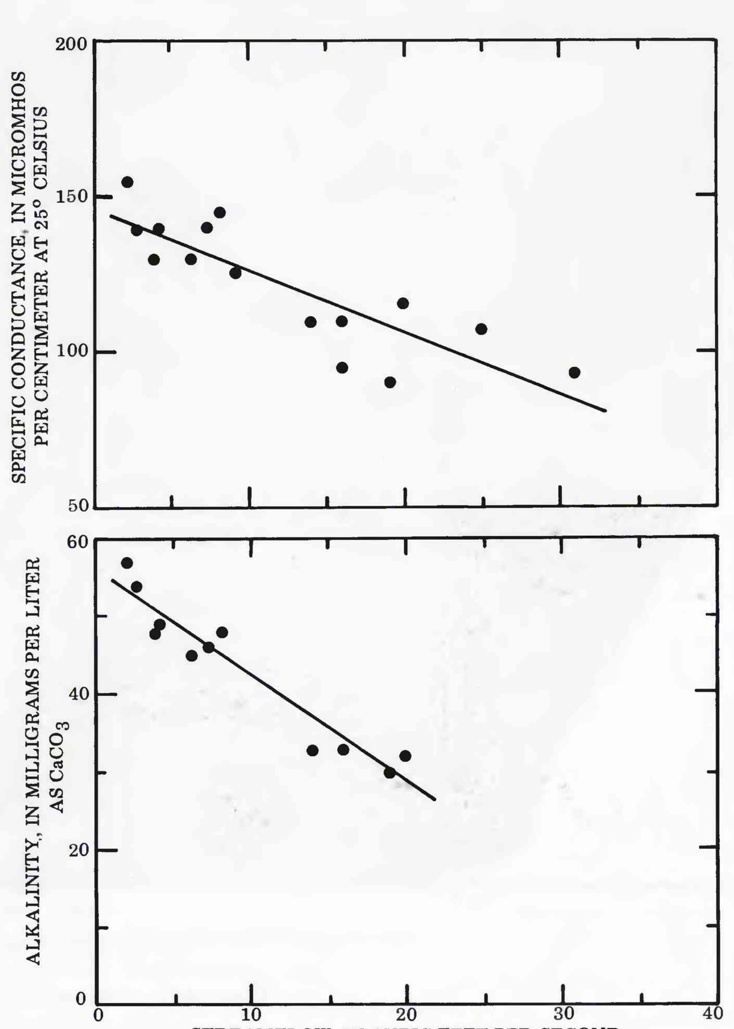

Figure 14. -- Relationships of streamflow to specific conductance and alkalinity at Little Rabbit Creek at Anchorage.

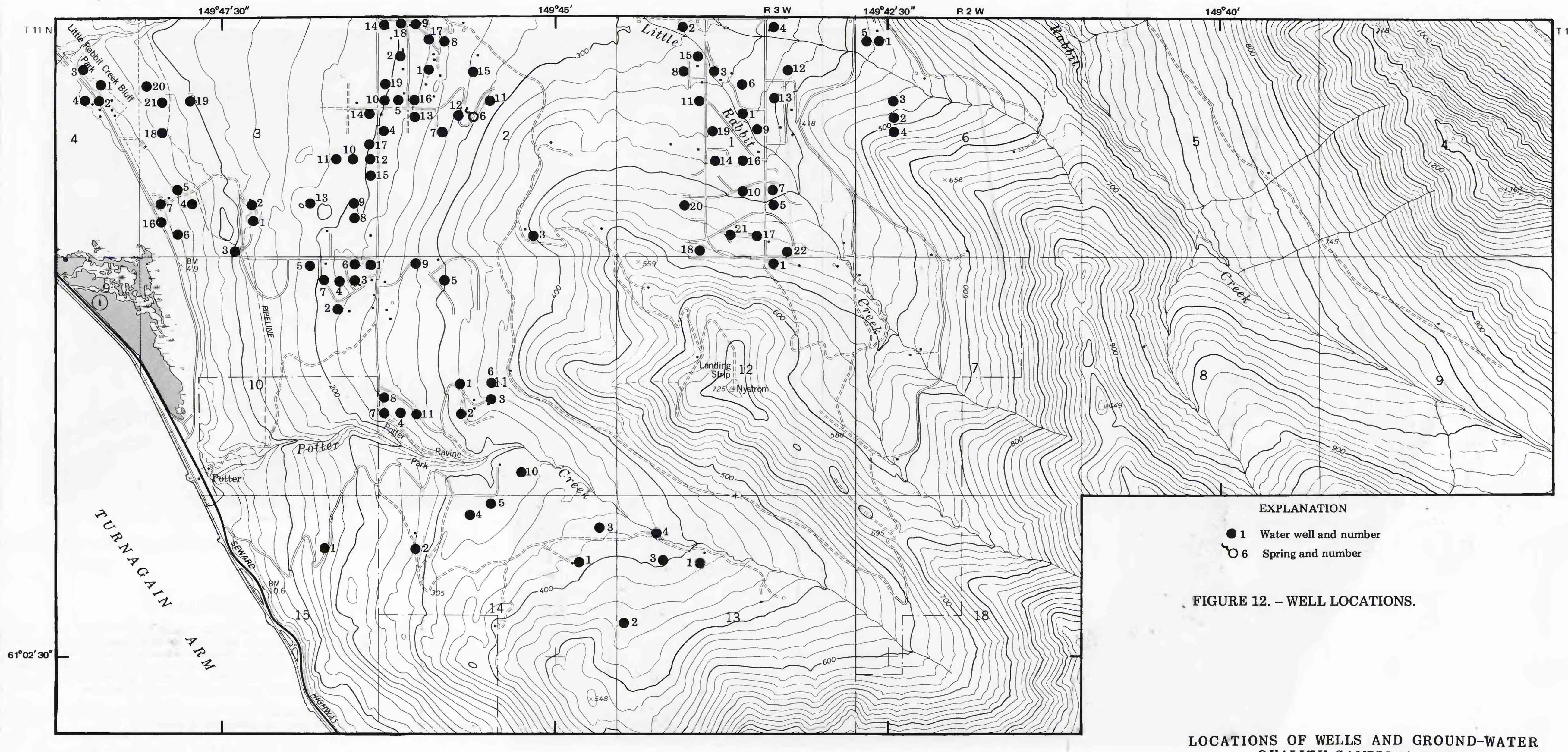

FIGURE 12. -- WELL LOCATIONS.

SCALE 1:25 000
1 .5 0 1 2 KILOMETERS
½ 0 1 MILE
1000 0 5000 FEET
CONTOUR INTERVAL 20 METERS

Table 6. -- Regression analysis results: water-quality data from six sites on Little Rabbit and Potter Creeks

Independent variable	Dependent variable	Number of observations (n)	Regression equation	Coefficient of determination (R^2)	Standard error of estimate (Syx)
Specific conductance (µmhos)	Bicarbonate (mg/L as HCO_3)	17	y = -15.5 + 0.57 X	0.96	2.6
Specific conductance (µmhos)	Hardness (mg/L as $CaCO_3$)	17	y = -11.3 + 0.56 X	0.95	2.9
Specific conductance (µmhos)	Calcium (mg/L as Ca^{2+})	17	y = -1.8 + 0.16 X	0.87	1.4
Specific conductance (µmhos)	Magnesium (mg/L as Mg^{2+})	17	y = -1.7 + 0.04 X	0.63	0.7
Specific conductance (µmhos)	Sodium (mg/L as Na^+)	17	y = -0.7 + 0.02 X	0.60	0.4
Specific conductance (µmhos)	Dissolved solids (mg/L residue at 180 °C)	12	y = -9.1 + 0.66 X	0.73	8.0
Streamflow (ft³/s)	Specific conductance (µmhos)	15	y = 146 - 2.0 X	0.72	11.0
Streamflow (ft³/s)	Alkalinity (mg/L as $CaCO_3$)	11	y = 56 - 1.4 X	0.92	28.0

EXPLANATION OF TABLE 7 HEADINGS

Section and map number identify well locations using a scheme based on the township and range system of the U.S. Land Survey. All sections in the study area are in township 11 north (T. 11 N.), and either range 2 west (R. 2 W.) or R. 3 W. relative to the Seward meridian. Of the sections in the study area in R. 2 W., only section 6 has wells for which data are available; all other sections on the table are in T. 11 N., R. 3 W. Each well in table 7 has a number that corresponds to the site number in the appropriate section in figure 12. (See the text accompanying figure 12.)

Owner is the person or other entity responsible for the well. If ownership has changed, additional names may be available in Watstore files; only one owner is listed in the table.

Depth drilled indicates the maximum depth drilled.

Depth of well is the depth of the lowest opening in the finished well; normally, the depth is that to the bottom of the casing or well screen.

Depth cased is the depth to the bottom of the solid casing.

Finish refers to the nature of the opening(s) that allows water to enter the well: 0 = open casing; X = open hole; S = screen; F = gravel pack with perforations; P = perforated or slotted; W = walled; Z = other.

Water level is the depth to water in a completed, non-pumping well. An F indicates the well is flowing, having a hydraulic head above the land surface; the elevation of this head above land surface may not have been measured. Next to the water level is shown the method used to determine it: E = estimated; G = pressure gage; T = electric tape; R = reported (usually by driller), method of measurement unknown.

Date water level measured refers to the water level shown on the table; other measurements and dates may be stored in Watstore files and can be retrieved.

Discharge is the reported rate of pumping or of natural flow of the well; an F accompanying the numeral indicates the well is naturally flowing.

Drawdown is the distance (generally the maximum observed) from the static or unstressed water level in the well to the level of water in the well during pumping at the reported discharge rate.

Pumping period is the length of time during which the well is pumped, at the discharge rate reported, to achieve the drawdown reported.

Date discharge measured is the date of the testing described in the preceding three columns.

Principal aquifer describes the geologic nature of the aquifer, if known, that supplies more than half the total well discharge. Unconsol. represents unconsolidated Quaternary sediments.

Lithology of principal aquifer is a more detailed description (if available) of the structure and composition of the principal aquifer than given under "Principal Aquifer."

Depth to bedrock is the depth to the top of consolidated sediments or rock, as reported by the driller.

Table 7. -- Well data from the Potter Creek study area [See figure 12 for well locations.]

Township	Range	Section	Well number	Owner	Depth drilled (ft)	Depth of well (ft)	Depth cased (ft)	Finish	Water level (ft)	Date water level measured	Discharge (gal/min)	Drawdown (ft)	Pumping period (hours)	Date discharge measured	Principal aquifer	Lithology of principal aquifer	Depth to bedrock (ft)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LOCATIONS OF WELLS AND GROUND-WATER QUALITY SAMPLING SITES

The locations of the 119 wells in the Potter Creek area for which information was on file in the U.S. Geological Survey's Watstore computer file system as of May 1980 are shown in figure 12. All these wells serve private residences. Also shown are the four wells from which samples were obtained for ground-water quality analysis.

Well locations were plotted using township, range, section, and site number. Township, range, and section are a standard basis for locating areas on maps (Compton, 1962). To locate wells within sections, map numbers are assigned sequentially to wells as well logs are received and processed. Wells located very close together (within about 300 ft) may share a single map number. Thus, some points shown on figure 12 represent more than one well. Table 7 provides data on individual wells.

WELL DATA

Data from drillers' logs of the 119 wells in the Potter Creek area used in this report are given in table 7. The table only summarizes pertinent information and is not exhaustive. Only one entry of each data type is shown for each site. For example, although a well may have been test pumped on more than one occasion, data from only one such test appear in the table. The entry selected for the table is not necessarily the most recent. Kinds of data for which more than one entry may be on file are: owner, types of logs available, water level, date of water level measurement, discharge, date of discharge measurement, drawdown, and pumping period. All available data can be retrieved from computer files if needed.

For additional information contact the U.S. Geological Survey, 1209 Orca Street, Anchorage, Alaska, 99501.

SUMMARY AND CONCLUSIONS

Factors limiting residential and other development in the Potter Creek area are chiefly: 1) water supply, 2) surface drainage conditions, and 3) disposal of wastes by onsite systems.

Hydrologic Cycle

- Precipitation in the Potter Creek area is roughly twice that measured in the main part of the Anchorage bowl.
- Total streamflow in the Potter Creek study area is about 17 Mgal/d (26 ft³/s).

Water Quality

- Ground water is generally of potable quality, but it is moderately hard and may have somewhat high concentrations of iron and manganese.
- Surface water is generally of potable quality; predominant ions are calcium and bicarbonate, and the water is soft to moderately hard.

Water Supply

- Wells were the sole source of domestic water in 1980.
- Most wells in the study area obtain water from bedrock; the average well tapping bedrock is more than 200 ft deep and yields 4½ gal/min.
- Wells obtaining water from unconsolidated sediments are generally less than 100 ft deep and yield an average of 7½ gal/min.
- Where well yields are less than 3 gal/min, a means of storing water may be needed to assure an adequate supply of domestic water.
- A water supply adequate for domestic use can be obtained from wells throughout most of the Potter Creek area, so long as storage of water is provided where wells have low yields. Although small community water supplies may be obtainable, few wells could provide more than a domestic supply of water.

Drainage and Waste Disposal

- Wetlands and areas of shallow ground water occur in about 24 percent of the Potter Creek area; potential problems in such areas include seepage into excavations, unstable foundations and roadbeds, winter icings, and failure of septic systems.
- Septic systems may not operate safely where landslope exceeds 20 percent, where the permeability of surficial materials is very high or low, or where the water table or bedrock is within 15 ft of land surface. Suitability for septic systems may depend on the above factors in combination.
- Landslope exceeds 20 percent in more than half the study area.
- Bedrock occurs at the surface in about one third of the study area.
- Where maps indicate wetlands or shallow ground water, moderate to steep slopes, near-surface bedrock, or surficial materials of low permeability, site-specific investigations may be necessary to determine suitability for development.

HYDROGEOLOGY FOR LAND-USE PLANNING: THE POTTER CREEK AREA, ANCHORAGE, ALASKA

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1982