

HYDROGEOLOGY OF THE SELDOVIA AREA, ALASKA

By Gordon L. Nelson and Wesley R. Danskin

INTRODUCTION

Seldovia is a fishing community situated on Seldovia Bay in lower Cook Inlet (fig. 1). The population in 1978 was 582 (Kenai Peninsula Borough, written commun., 1978). Principal development is within about one-half mile of Seldovia Slough and along the Seldovia-Jakolof Bay Road (fig. 2).

The study area is mountainous, and the maximum relief is about 3,400 ft. Coastal cliffs along Kachemak Bay rise as much as 150 ft above the beaches. Numerous depressions in the land surface exist as boggy areas most of the year.

The purposes of this investigation are to evaluate the availability of ground water near Seldovia, to appraise the susceptibility of the area to pollution by on-site sewage disposal, and to identify other hydrogeologic problems that may influence development of the Seldovia area.

Investigations consisted primarily of evaluation of existing maps (Riehle, 1977; Forbes and Lanphere, 1973; and Magoon and others, 1976), field studies of surficial materials, and test drilling. A concurrent study of surface-water availability on the Kenai Peninsula, including the Seldovia area, began in June 1978 and is scheduled for completion in 1980.

This investigation is part of a cooperative program between the U.S. Geological Survey and the Kenai Peninsula Borough. A drilling rig and logistical support for the drilling program were provided through the cooperation of the City of Seldovia. Results of an investigation of foundation conditions in Fish Creek basin were provided by Cutler Engineering and Robertson and Sons, Inc.

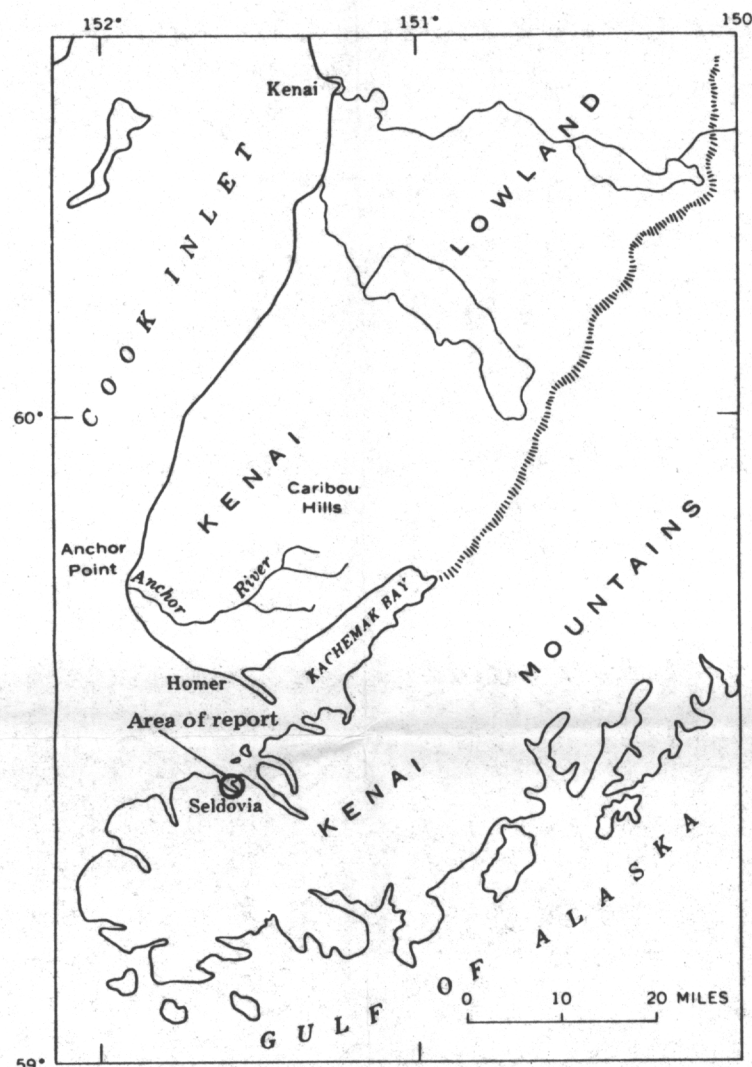
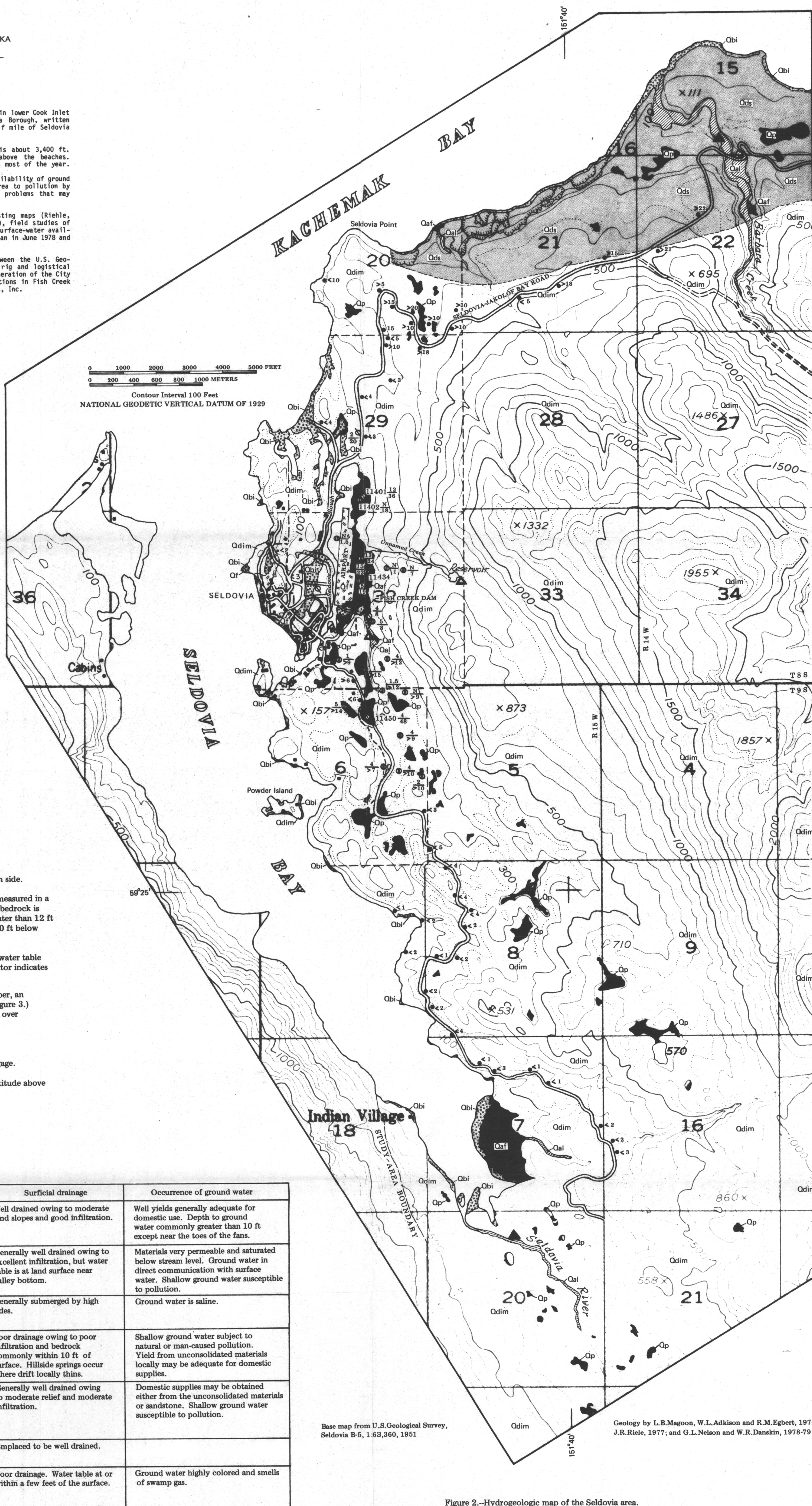


Figure 1.—Location of Seldovia on lower Cook Inlet.



- EXPLANATION**
- Geologic contact. Dashed where inferred.
 - ⤴ Slump block. Hachures are on down-thrown side.
 - 15 Data point where depth to bedrock can be measured in a road cut or streambank. In this example, bedrock is 15 ft below land surface. (>12 means greater than 12 ft below land surface; <10 means less than 10 ft below land surface.)
 - ⊙ $\frac{2}{10}$ Test boring. Numerator indicates depth to water table (N means no water in hole) and denominator indicates depth to bedrock.
 - ⊙ 11450 $\frac{4}{48}$ Observation well with Alaska Register number, an arbitrary index number. (See well logs, figure 3.) Fraction $\frac{4}{48}$ indicates depth to water table over depth to bedrock.
 - ▲ Continuous-record stream-gaging station
 - ▲ Partial-record stream-gaging site without a gage.
 - 500— Topographic contour. Number indicates altitude above National Geodetic Vertical Datum.
 - ⋯ Intermediate topographic contour.
 - == Improved gravel road.
 - - - Unimproved dirt road or trail.

Map unit	Materials and occurrence	Surficial drainage	Occurrence of ground water
Qaf Alluvial fan deposits	Poorly sorted silt, sand, and gravel deposited at the mouths of steep tributaries. May be several tens of feet thick.	Well drained owing to moderate land slopes and good infiltration.	Well yields generally adequate for domestic use. Depth to ground water commonly greater than 10 ft except near the toes of the fans.
Qal Stream alluvium	Well-sorted sand and gravel deposited by major streams. Deposits generally thin and underlain by bedrock.	Generally well drained owing to excellent infiltration, but water table is at land surface near valley bottom.	Materials very permeable and saturated below stream level. Ground water in direct communication with surface water. Shallow ground water susceptible to pollution.
Qbi Beach and intertidal deposits	Materials vary from mud to boulder gravel, depending on wave action. Deposited below high tides.	Generally submerged by high tides.	Ground water is saline.
Qdim Glacial drift over igneous and metamorphic bedrock	Undifferentiated glacial drift overlying relatively impermeable crystalline bedrock. Locally redeposited by fluvial or colluvial processes.	Poor drainage owing to poor infiltration and bedrock commonly within 10 ft of surface. Hillside springs occur where drift locally thins.	Shallow ground water subject to natural or man-caused pollution. Yield from unconsolidated materials locally may be adequate for domestic supplies.
Qds Glacial drift over sedimentary bedrock	Undifferentiated glacial drift overlying poorly indurated sandstone and siltstone. Drift locally redeposited by fluvial and colluvial processes. Top of bedrock commonly more than 10 ft below land surface.	Generally well drained owing to moderate relief and moderate infiltration.	Domestic supplies may be obtained either from the unconsolidated materials or sandstone. Shallow ground water susceptible to pollution.
Fill	Artificial fill material (usually rock) at airport and along waterfront.	Emplaced to be well drained.	
Qp Peat	Vegetative mat that may be thicker than 10 ft. Generally overlying drift or alluvium in topographic depressions.	Poor drainage. Water table at or within a few feet of the surface.	Ground water highly colored and smells of swamp gas.

Base map from U.S. Geological Survey, Seldovia B-5, 1:63,360, 1951

Geology by L.B.Magoon, W.L.Adkinson and R.M.Egbert, 1976; J.R.Riele, 1977; and G.L.Nelson and W.R.Danskin, 1978-79

Figure 2.—Hydrogeologic map of the Seldovia area.

HYDROGEOLOGY OF THE SELDOVIA AREA, ALASKA

By
Gordon L. Nelson and Wesley R. Danskin
1980