Surficial Geology_/

by

Frank W. Trainer_/

The [illegible] in the [illegible] Big Lake, Susitna River, Willow, and [illegible] chiefly to the action of [illegible]. The dominant topographic features [illegible] belt of ridges and [illegible] Cook Inlet [illegible] of lower, nearly level [illegible] Lower [illegible] the [illegible]

[illegible]

_/ Publication authorized by the Director, U. S. Geological Survey
_/ Geologist, Ground Water Branch, U.S.Geological Survey, Anchorage, Alaska

parallel and separated by lakes. West and southwest of Big Lake the morainal belt consists of irregular hills that lack ridge form. To the south, other ridges extend about 8 miles north from Knik Arm near Anchorage.

The morainal ridges were probably formed by a combination of such processes as glacial push, sliding of rock debris from the ice, and collapse of deposits that lay on or against the ice, as melting proceeded. Where examined, the moraine consists of till—a deposit of mixed stones, sand, silt, and clay. In places the debris was probably sorted by running water, and locally it may consist of [illegible] gravel or sand. In general, however, the [illegible] is [illegible]ively impermeable, and depressions in it are [illegible].

The form of the [illegible] west and southwest of Big Lake suggests that [illegible] ice, formerly buried here beneath gravel [illegible], melted and left the irregular hills and poorly drained depressions. [illegible] in or beneath the hills in [illegible], and [illegible] the poor drainage is probably [illegible] till [illegible].

[illegible] side [illegible] stern [illegible] is [illegible]

possibly to or beyond Little Susitna River, is part of this outwash plain. The western and northwestern bounderies of this plein heve therefore been drawn tentatively in figure . The lake basins mey be depressions left by the melting of buried blocks of ice; if so, they indicate that glacial ice extended this far west at some time before construction of the outwash plain.

The remainder of the area between the moraine and Susitna River is a nearly level surface that is generally marshy except near the [illegible] that cross it. Cuts along Susitna River and along Little [illegible] River near its mouth expose 15 to 30 [illegible] sand, with well developed [illegible] with what appear to be [illegible] channels [illegible] moraine [illegible] Susitna River, [illegible] former floodplain. [illegible]

and at a time when the relative levels of land and sea were different from those of the present. The clay is relatively impermeable, and springs and seeps occur along its contact with the overlying sand. Such springs and seeps may explain the presence of well drained land bordering the streams that cross the area west of the moraine. The poor surface drainage over the remainder of this tract suggests that the buried clay is more widely distributed than can be demonstrated by the few available exposures.

Hilltops, slopes, and well drained flat land throughout the entire area described by this report are covered by a mantle of silt in which soils have developed. The silt mantle is absent on low land along [illegible] streams, where gravel, sand, or [illegible] surface, and in poorly drained areas where [illegible].

[illegible] forms a [illegible] thick- [illegible] present [illegible]

defined over silty till but in sections examined could be determined within a few inches.

This mantle of silt appears to be continuous to the east with a similar one which, in at least part of the Matanuska Valley, has clearly been deposited by wind (Tuck, 1938; Trainer, 1953, pp. 14-15). The writer believes the character of the silt deposit in the area described by this report— a mantle of relatively uniform thickness, continuous over irregular topography, and consisting of silt and sandy silt distinctly unlike the underlying materials— indicates that it, too, was deposited by wind. The mantle is somewhat thicker in the western part of [illegible] than to the east, and much of the dust was therefore probably blown from sources to the west, such as bare flats [illegible] the river. It is possible that some of the dust may also have been blown from flood-plains to the east [illegible] the east. The edge of the silt mantle [illegible] the glacial deposits [illegible] elevation believed [illegible] between [illegible] above [illegible] elevation

Literature Cited

Karlstrom, T. N. V., 1953, Upper Cook Inlet region, Alaska: in Pewe, T. L., and others, Multiple glaciation in Alaska, U. S. Geol. Survey Cir. 289, pp. 3-5.

Trainer, F. W., Preliminary report on the geology and ground-water resources of the Matanuska Valley agricultural area, Alaska: U. S. Geol. Survey Cir. 268.

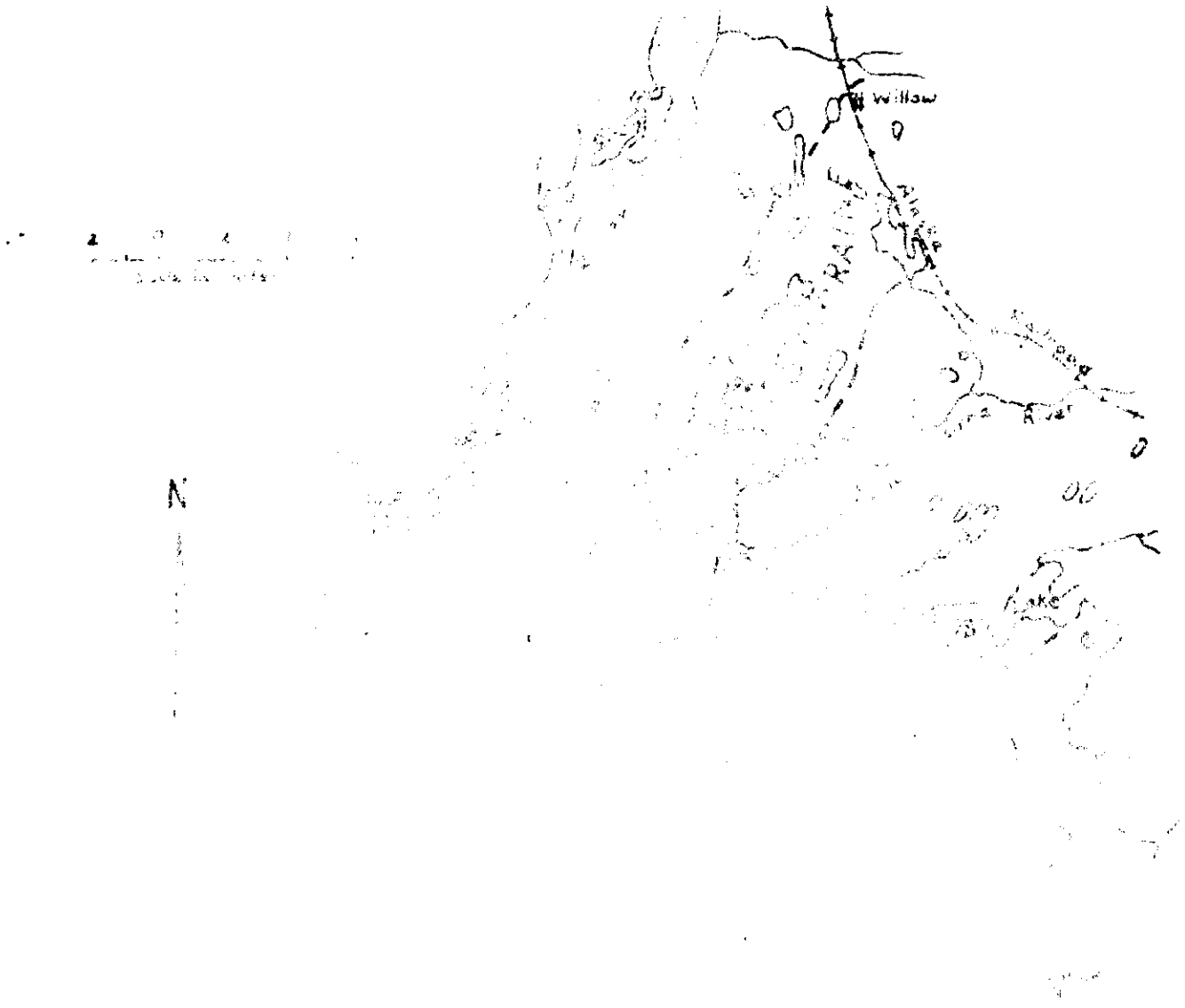
Tuck, [illegible], 1930, The [illegible] of the Matanuska Valley: Jour. [illegible], Vol. [illegible], [illegible] pp.

[illegible] Reports

[illegible], 1953, Descriptive [illegible]. Geol.

[illegible] of low-

[illegible]-


Willow
N

Mr. D. J. Cederstrom, Charlottesville, Virginia

February 10, 1955

F. W. Trainer, Anchorage, Alaska

Geologic Information for Soil Conservation report

References: Your memorandum, November 2, 1954, and Mr. [illegible]yre's memorandum, November 9, 1954, code 45040, on the [illegible] subject.

Enclosed [illegible] summary of the geology of an area adjoining [illegible] Valley as described in Circular [illegible]. [illegible] en in response to a request from Mr. George [illegible] [illegible]vation Service, Palmer, Alaska. Mr. Woodruff [illegible] section in a report describing [illegible] [illegible], of course, make the proper [illegible]

[illegible] as I know, not finally det[illegible] be submitted to the Department of [illegible] the later spring of 1[illegible].

Mr. [illegible] Conservation Service [illegible] [illegible] of Land Management, [illegible] Conservation District (a farmer-[illegible] [illegible] The report would not be a formal [illegible] [illegible] the public.

[illegible] manuscript is [illegible] from the probab[illegible] [illegible]re [illegible]tly. Survey[illegible]

[illegible],

[illegible]

IN REPLY REFER TO:

45040

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

March 3, 1955

Memorandum

To: Director

From: Chief, Water Resources Division

Subject: Approval [illegible] paper

Attached is a brief paper by [illegible] Trainer on the surficial geology of an area adjoining the [illegible] Matanuska Valley, Alaska, which was prepared at the [illegible] Soil Conservation Service for inclusion as a chapter in [illegible] soils of the area. This paper has been reviewed [illegible] Water Branch and appears to be in good order. It contains [illegible]. It is [illegible]sted that you approve the paper for release [illegible] Soil Conservation [illegible] which [illegible] be [illegible]