

Alaska Groundwater Monitoring Program

Alaska Hydrologic Survey
Alaska Department of Natural Resources
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Workshop on Hydrogeology in Yukon, YT
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Alaska Groundwater Monitoring Program

Why Are Groundwater Level Data Needed?

Water availability for Muni/Borough/Village Potable Supply

- groundwater storage and recharge dynamics
- the response of groundwater aquifers to climate variability and drought

Water availability for surface water bodies

- the interaction between groundwater and surface-water

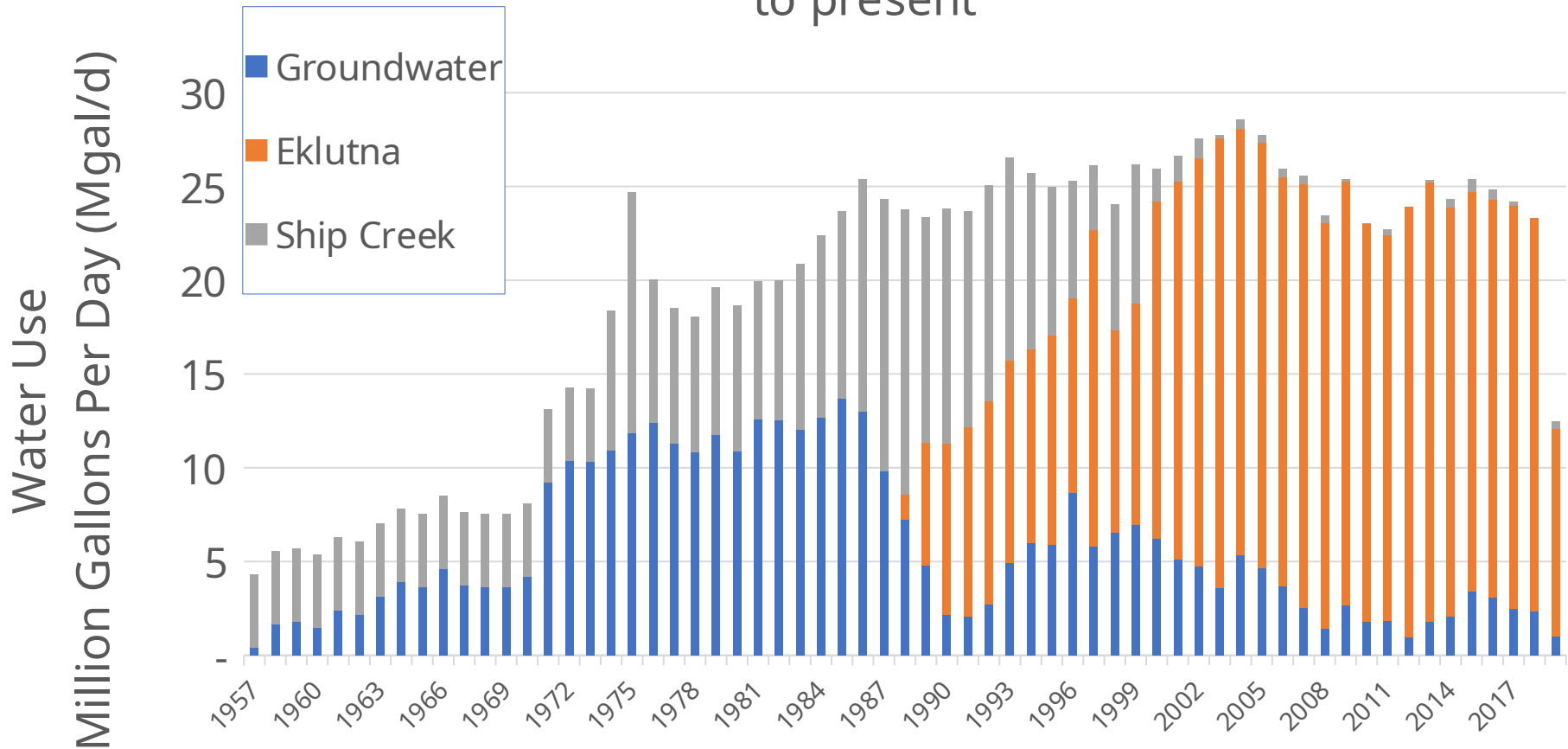
Water availability in response to natural disturbances

- the effect of earthquakes on groundwater levels and water supply wells

History of Groundwater Monitoring in Alaska (statehood-present)

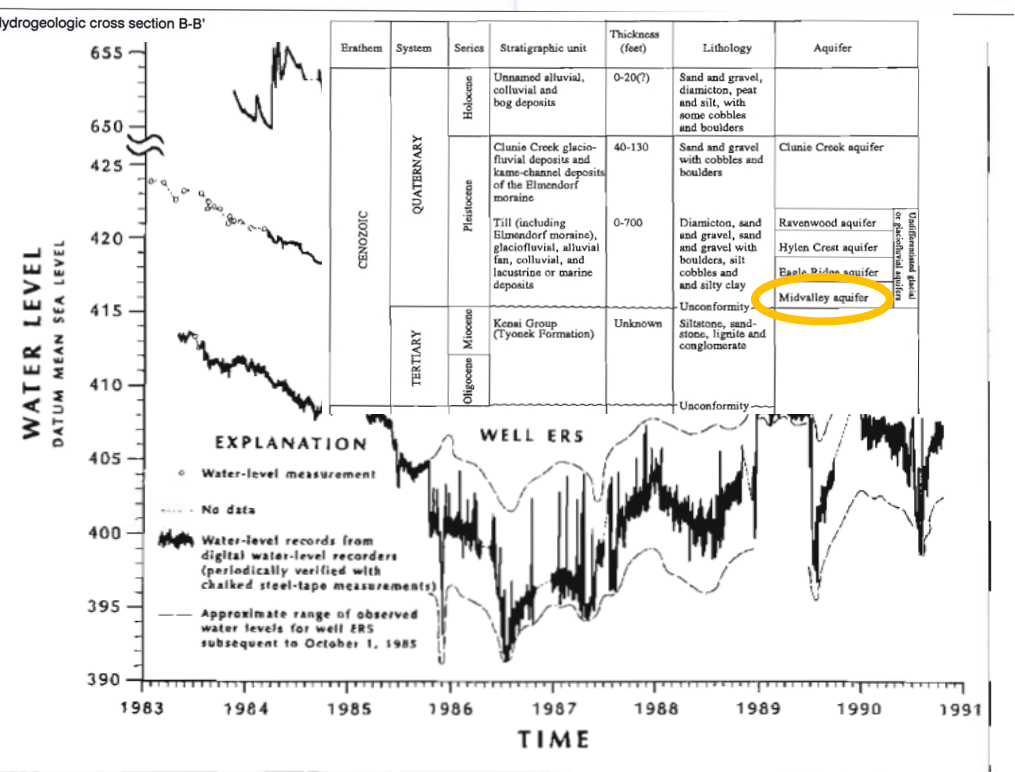
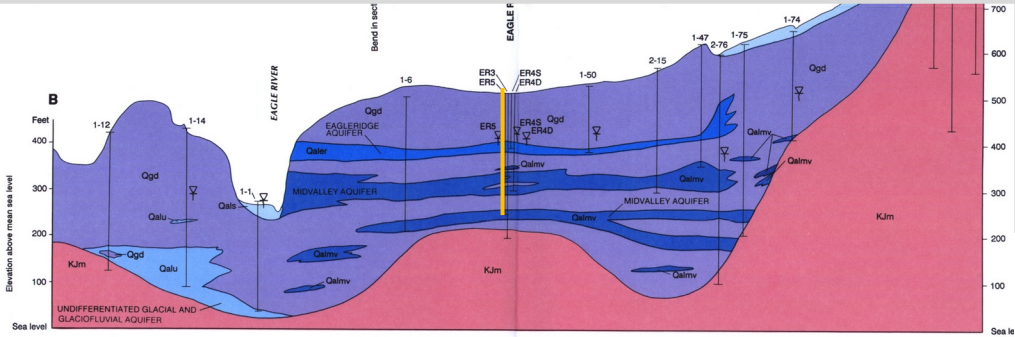
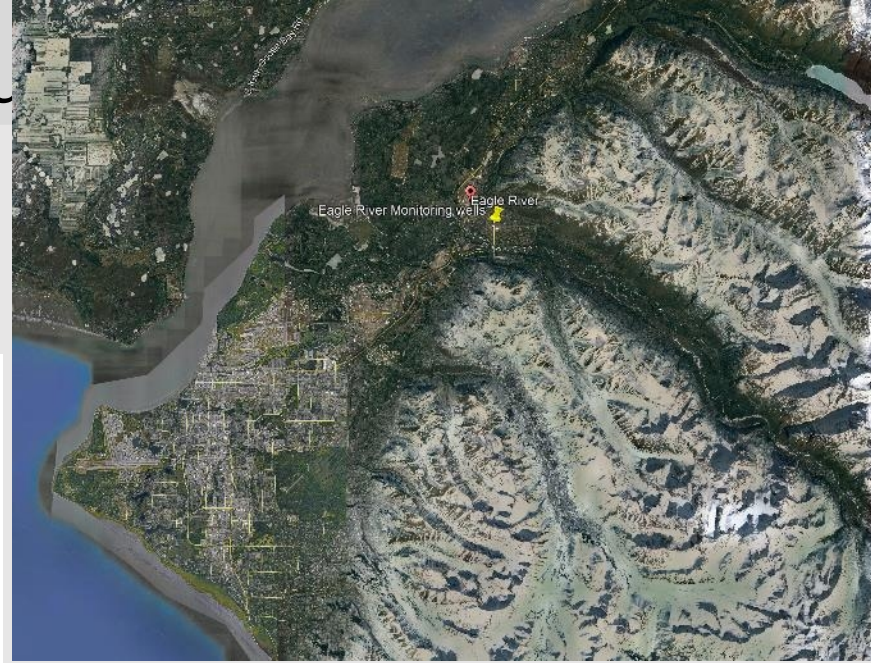
- In 1950s – much interest in water resources in Alaska – 100 wells inventoried after the Good Friday Earthquake with continuous pre- and post-response in >30 wells*
- 1972 USGS maintained 80 observation wells and 1 spring in Alaska
- 2013 the state began an ad-hoc groundwater monitoring program
- 2019 USGS maintains four observation well in Alaska
- 2020 TOTAL*: with combined efforts among local, state, and federal agencies with cooperation from private landowners increased the # of observation wells in Alaska to ~15 (~10 state, 4 USGS)

Anchorage Water and Wastewater Utility Water Use 1957 to present



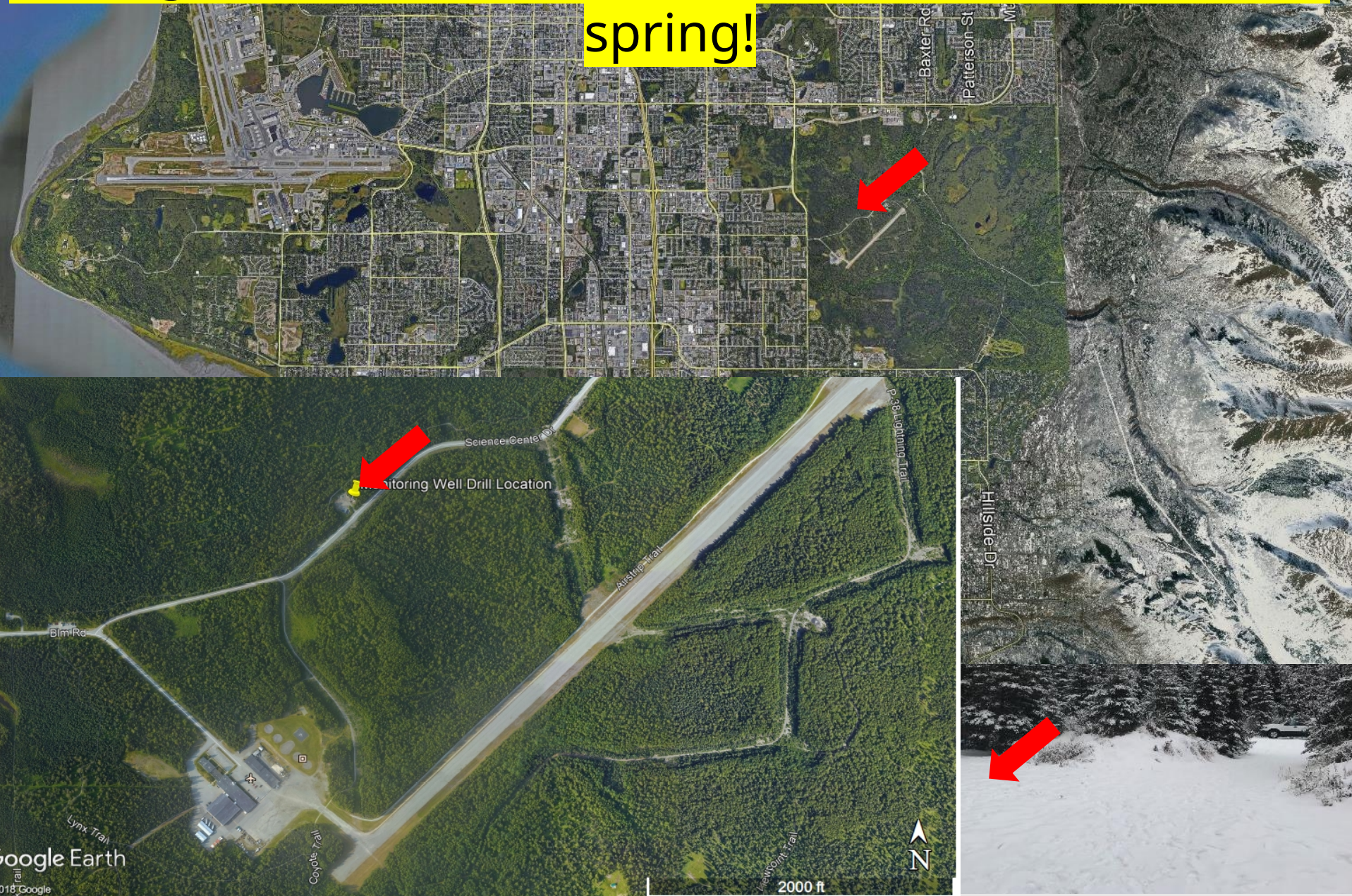
Monitoring Well Rehabilitation and Re-Establishment, Eagle River, AK

Well ER-5 confined, mid-valley aqu



National Groundwater Monitoring Network

Drilling a new monitoring well before snow flies....this spring!



data harvested from AK state servers to the National Groundwater Monitoring Network



National Groundwater Monitoring Network

USGS Grant Awarded to DNR in 2016



National Ground-Water Monitoring Network

The National Ground-Water Monitoring Network (NGWMN) is a product of the [Subcommittee on Ground Water](#), of the Federal Advisory Committee on Water Information (ACWI). The NGWMN is a compilation of selected groundwater monitoring wells from Federal, State, and local groundwater monitoring networks across the nation.

The [NGWMN Data Portal](#) provides access to groundwater data from multiple, dispersed databases in a web-based mapping application. The portal contains current and historical data including water levels, water quality, lithology, and well construction. The NGWMN is currently in the process of adding new data providers to the Network. Agencies or organizations collecting groundwater data can [find out more about becoming a data provider for the Network](#).

Funding to support data providers to the National Ground-Water Monitoring Network is provided through USGS Cooperative Agreements. Agencies can also find information about the status of the [USGS cooperative agreements](#).

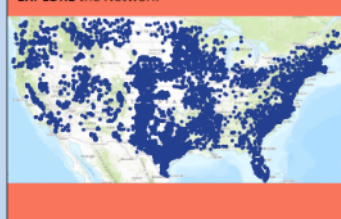
CURRENT NETWORK:

7226 water-level wells
1943 water-quality wells
10 subnetworks
29 contributing agencies
54 administrative units
63 principal aquifers

LEARN about the Network

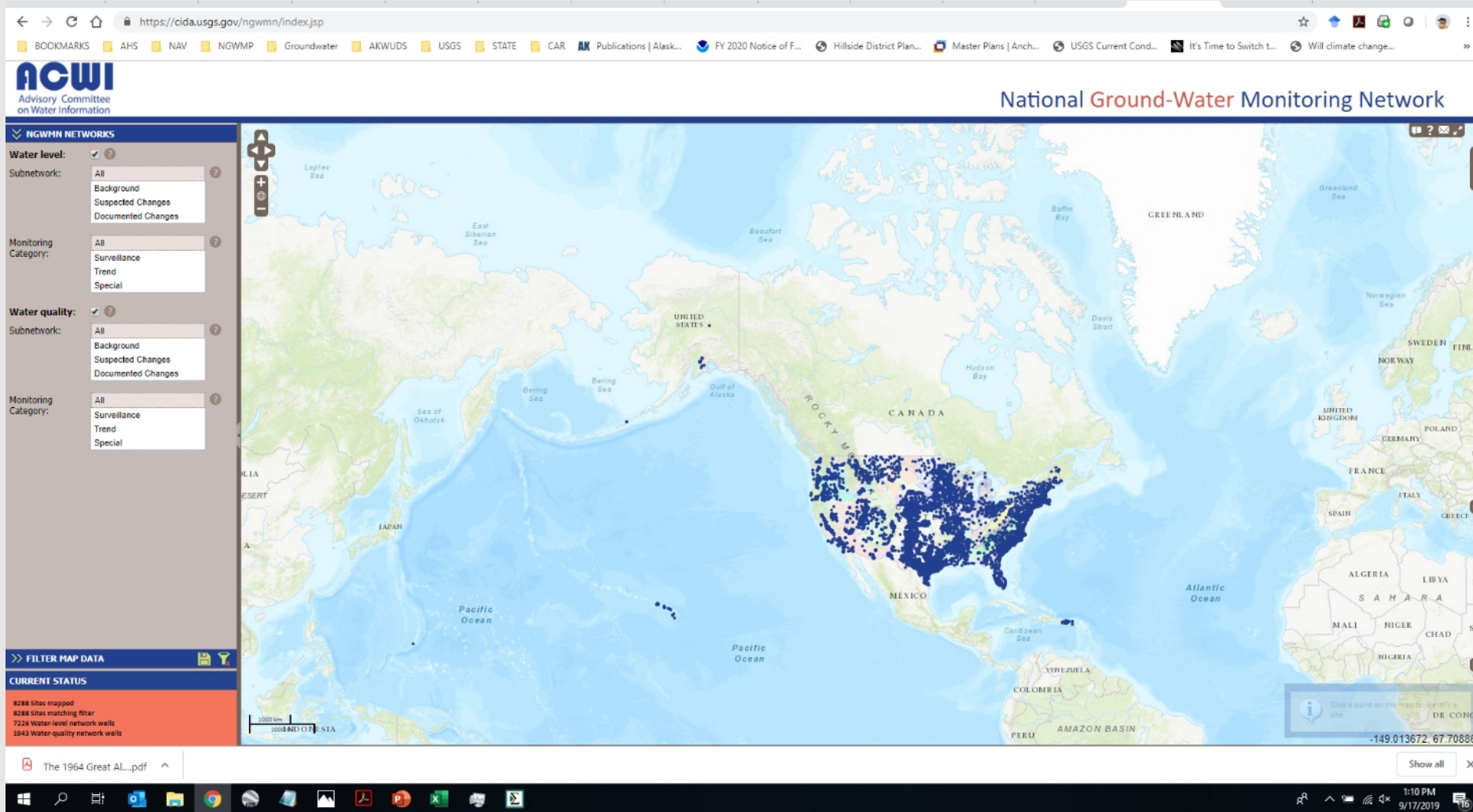


EXPLORE the Network



<https://cida.usgs.gov/ngwmn/>

National Groundwater Monitoring Network



<https://cida.usgs.gov/ngwmn/index.jsp>

National Groundwater Monitoring Network

 An official website of the United States government [Here's how you know](#) ▼



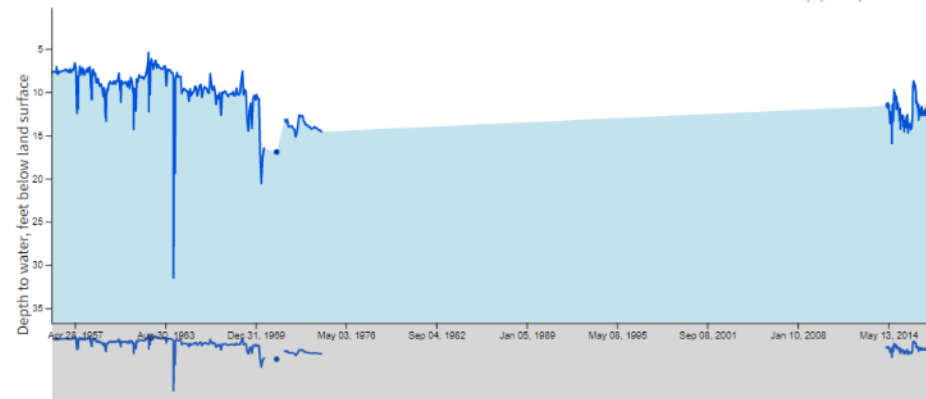
National Ground-Water Monitoring Network

UAF AG

Alaska Department of Natural Resources

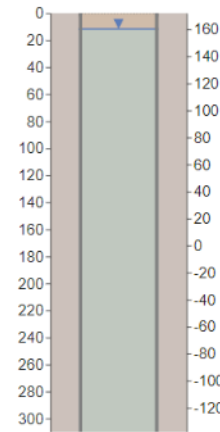
Water Levels, in feet below land surface

11.67 ft - 5/3/2017, 12:00:00 AM



☐ Show lithology

Depth below land surface in feet



Elevation(NGVD29) in feet

Located in Matanuska-Susitna Borough, Alaska, this groundwater monitoring location is associated with a water well in the Alaska unconsolidated-deposit aquifers.

Well Construction

Detailed Lithology

All Screens Casings

Depth	Description
0.0-310.0 ft	6.0 in diameter steel casing
None-None not applicable	open ended screen

Summary

Water Quality

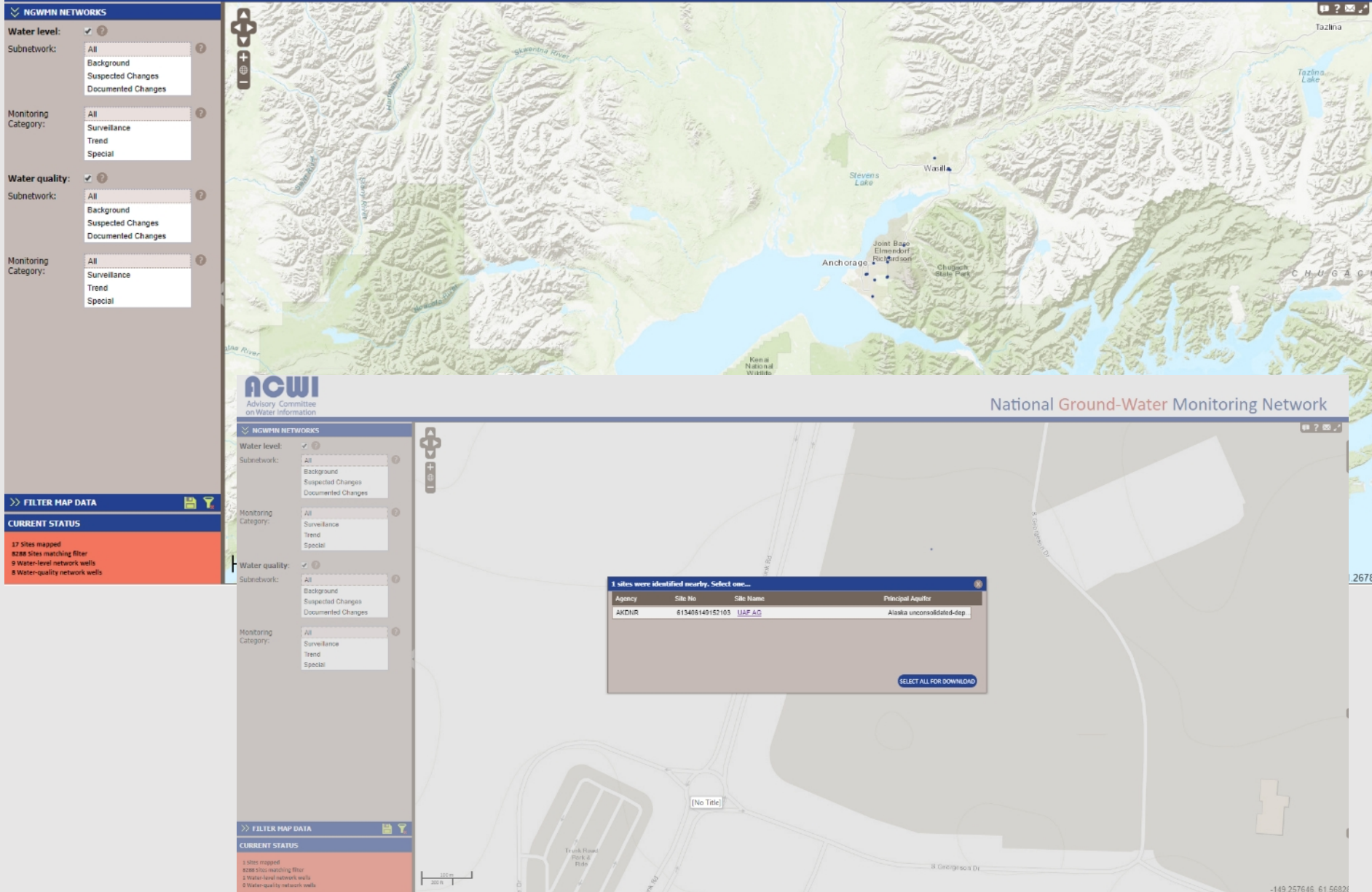
Water Levels

<https://cida.usgs.gov/ngwmn/provider/AKDNR/site/613406149152103/>

Matanuska Exp Farm Well – NGWMN



National Ground-Water Monitoring Network




The screenshot displays the NWMM Networks application interface. On the left, a sidebar contains several filter sections:

- Water level:** Includes a dropdown menu with options: All, Background, Suspected Changes, and Documented Changes.
- Monitoring Category:** Includes a dropdown menu with options: All, Surveillance, Trend, and Special.
- Water quality:** Includes a dropdown menu with options: All, Background, Suspected Changes, and Documented Changes.
- Subnetwork:** Includes a dropdown menu with options: All, Background, Suspected Changes, and Documented Changes.

The main area shows a map with a blue dot indicating a site. A pop-up window titled "1 sites were identified nearby. Select one..." displays the following information:

Agency	Site No	Site Name	Principal Aquifer
AKDNR	613406149152103	UAF AG	Alaska unconsolidated-dep...

The bottom of the interface shows a status bar with the number "6707" and a page indicator "1 / 5".



ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
Alaska Hydrology Survey

6707

WATER WELL LOG Revised 09/18/2016

Drilling Started: / /

Completed: 9 / 10 / 1955

Pump Install: / /

City/Borough	Subdivision	Block	Lot	Property Owner Name & Address
Palmer	MAT 701 EXHIBIT 10, 10/1955		NONE	UNIVERSITY OF ALASKA FAIRBANKS, AK

Well location: Latitude 61.588287

Meridian S Township 017N Range 001E Section 15 NE 1/4 of SW 1/4 of NE 1/4 of NW 1/4

Longitude -149.27254

BOREHOLE DATA: (from ground surface)

Suggest I.M. Name's hydrogeological classification system?

<https://www.arctic-planet.org/ARCTIC/ARCTIC%20CLASSIFICATION%20SYSTEM%201994.pdf>

	From	To
TOP SOIL	0.0	3.0
GRAVEL	3.0	5.0
SAND	5.0	9.0
GRAVEL WITH BOULDERS	9.0	24.0
SAND CLAY BROWN	24.0	32.0
SAND WITH WATER GRAY	32.0	38.0
FINE BROWN SAND	38.0	48.0
FINE TO COARSE GRAY SAND	48.0	52.0
CLAY WITH STREAKS OF GRAY SAND	52.0	69.0
CLAY WITH STREAKS OF BROWN SAND	69.0	74.0
SANDY GRAY CLAY	74.0	82.0
FINE GRAY SAND	82.0	106.0
FINE SAND WITH CLAY STREAKS	106.0	114.0
SAND WITH CLAY CLINKS AND SMALL PERLITES	114.0	120.0
CLAY AND SAND GRAY	120.0	123.0
TILL GRAY	123.0	137.0
HEAVING SAND	137.0	154.0

(Circle description or sketch of well location (include near buildings, etc.))

Drilling method: ☒ Air rotary ☐ Cable tool ☐ Other

Well use: ☒ Public supply ☐ Domestic ☐ Rejection ☐ Hydrofracturing

☐ Commercial ☐ Observation/Monitoring ☐ Test/Exploratory ☐ Cooling

☐ Irrigation/Agriculture ☐ Grounding ☐ Recharge/Aquifer Storage

☐ Heating ☐ Geothermal Exploration ☐ Other

Fluids used:

Depth of fluid: 310 ft Casing stickup: 5.5 ft

Casing type: STEEL Casing thickness: inches

Casing diameter: 5 inches Casing depth: 310 ft

Line type: Depth: ft Diameter: inches

Note: CASING DEPTH BASED ON 110/120 IN VIDEO LOG

Well intake opening type: ☐ Open end ☐ Open hole ☒ Other

Screen type: Screen mesh size:

Screen start: ft Screen stop: ft Perforated ☐ Yes ☒ No

Perforation description: Perfor from: ft Perfor to: ft

Gravel packed ☐ Yes ☒ No Gravel start: ft Gravel stop: ft

Note:

Static water (from top of casing): 7.83 ft on 9 / 10 / 1955 Artesian well ☐

Pumping level & yield: feet after hours at gpm

Method of testing:

Development method: Duration: gpm

Recovery rate: gpm

Grout type: Volume ft

Depth: From ft To ft

Final pump intake depth: ft Model:

Pump size: hp Brand name:

Was well disinfected upon completion? ☐ Yes ☒ No

Method of disinfection:

Was water quality tested? ☐ Yes ☒ No

Water quality parameters tested:

Well owner name:

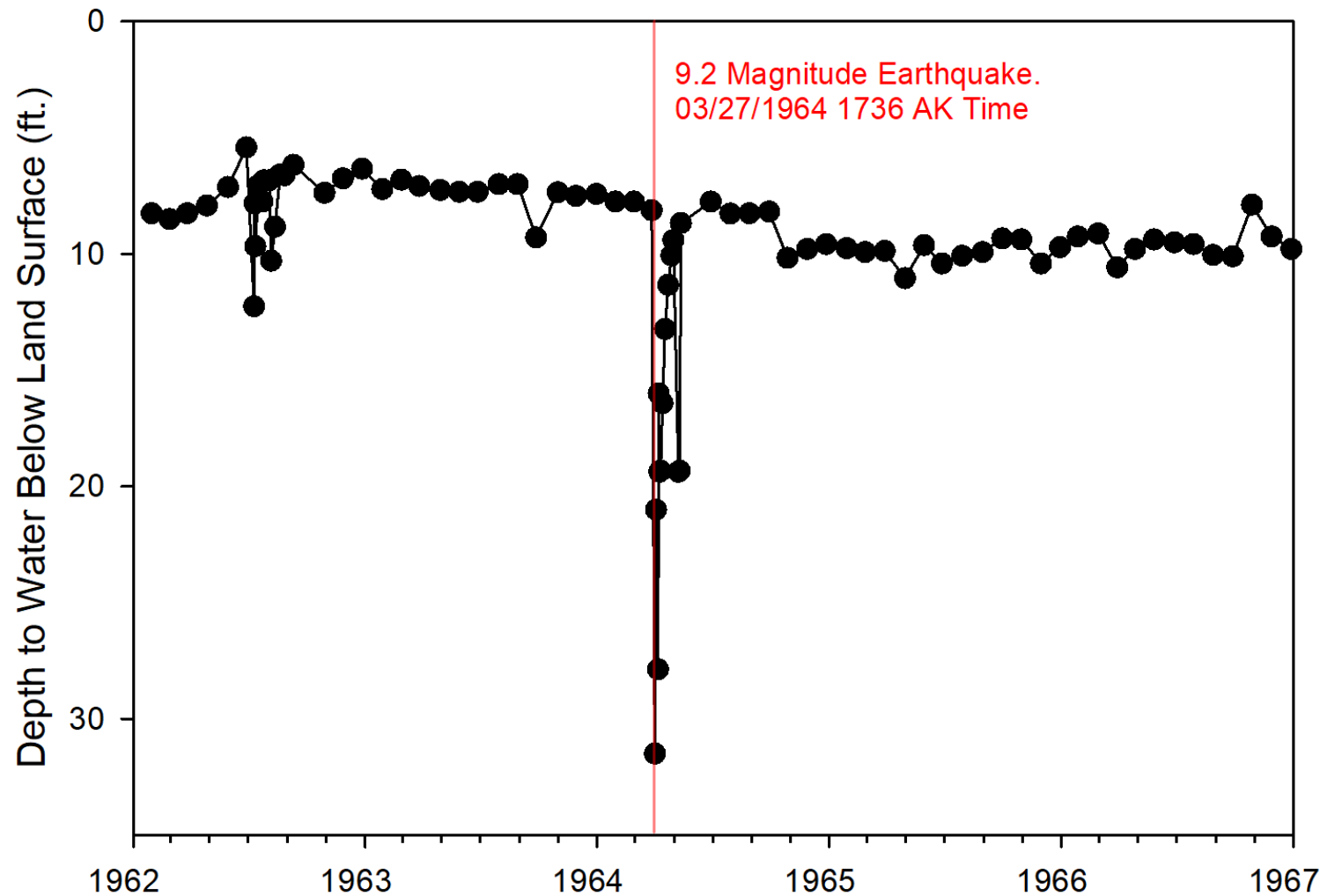
Company name: RAMSEY

Well log date:

[illegible]

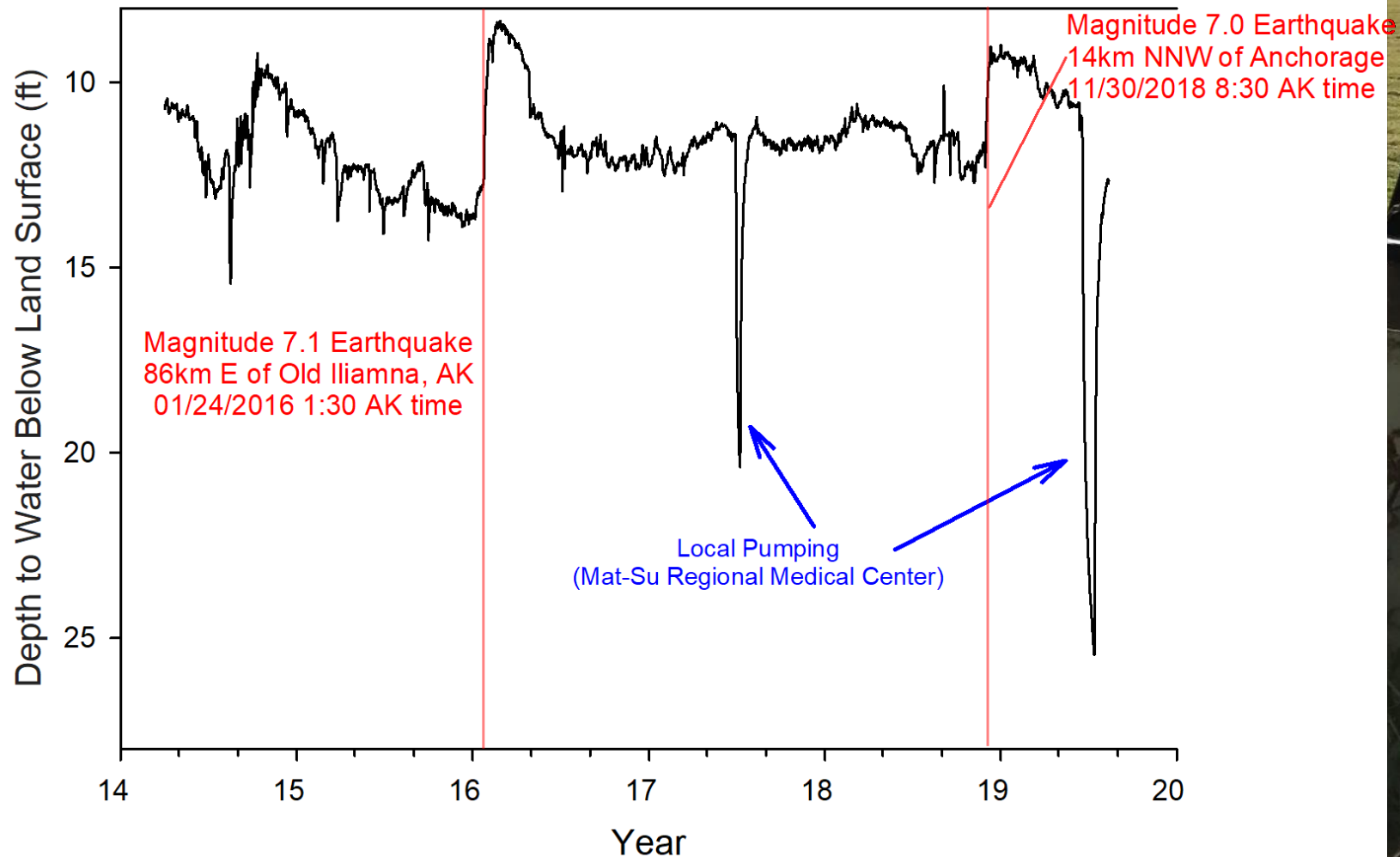
Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - Mar 27 1964 Earthquake



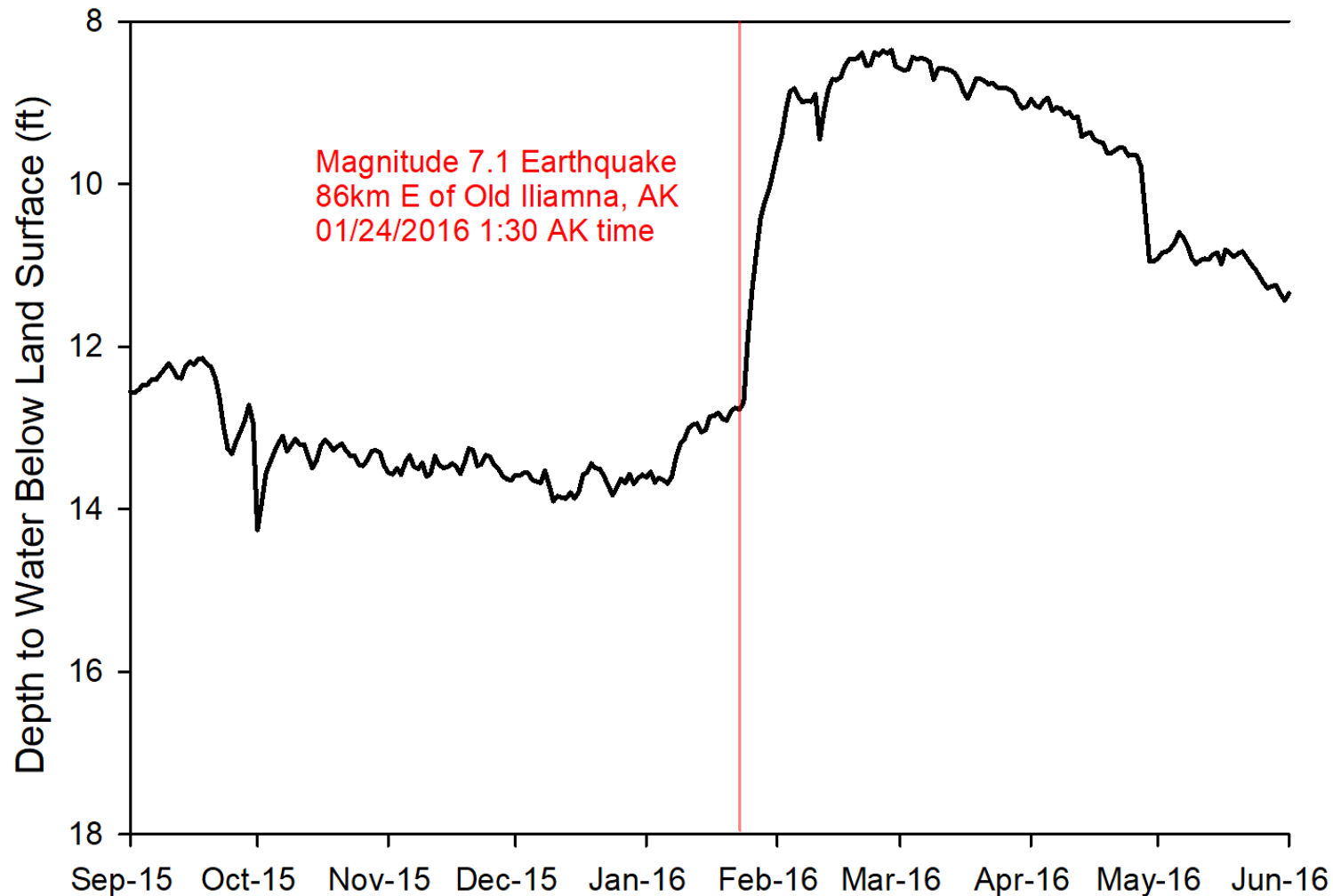
Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - 2014 to present



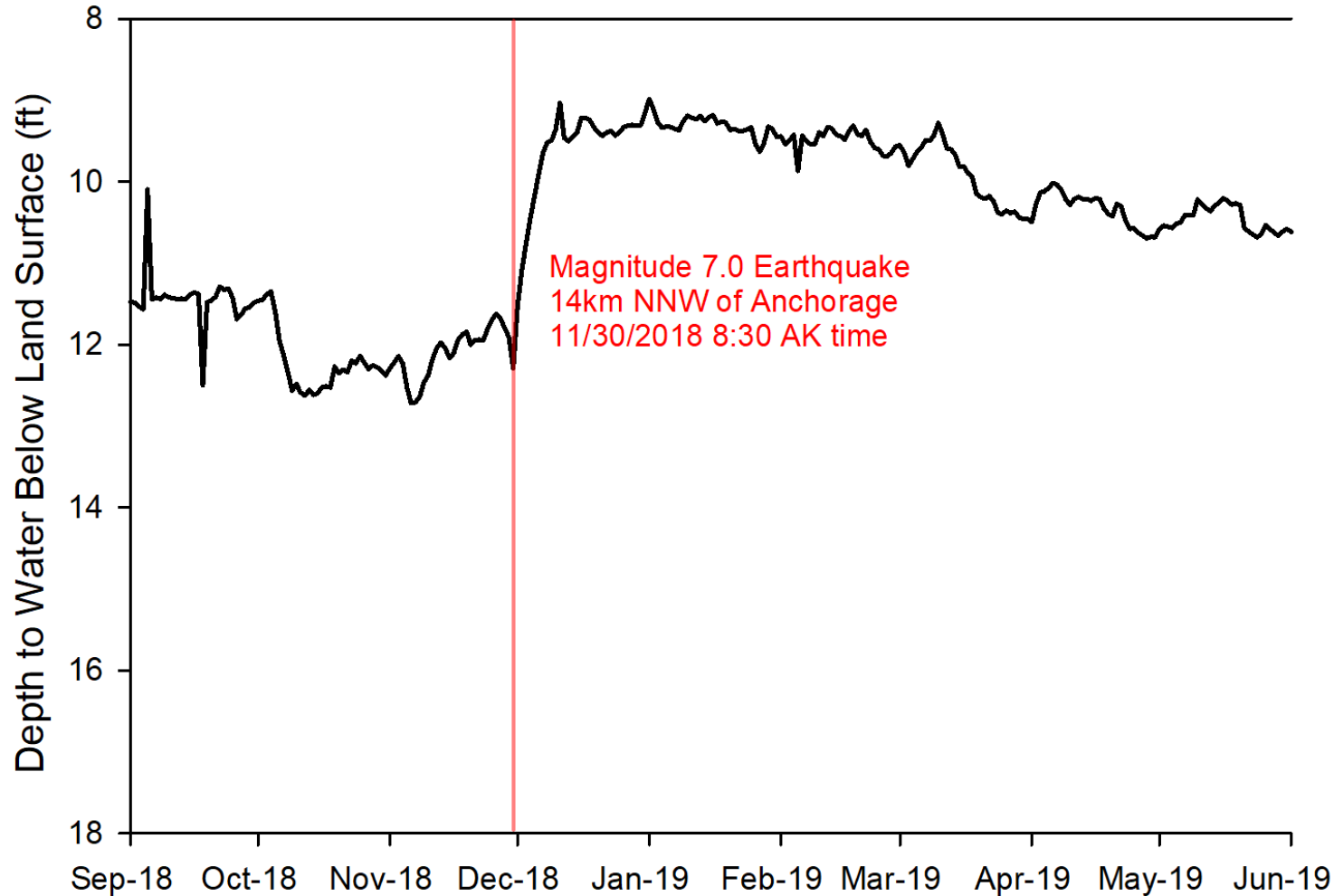
Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - Jan 24 2016 Earthquake



Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - Nov 30 2018 Earthquake



Questions

Contact information

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EFFECTS OF THE MARCH 1964 ALASKA EARTHQUAKE ON THE HYDROLOGY OF THE ANCHORAGE AREA, ALASKA

Generally, ground-water levels were residually lowered after the initial period of fluctuation. This lowering is attributed either to changes in the discharge zones offshore or to a change in the permeability of the aquifers by seismically induced strain.

Nearly all the pertinent data show that the artesian-pressure surface was lowered, locally as much as 24 feet, but that recovery started immediately and that within 6 months the water levels either had recovered to their former level or stabilized at a different level.

The Alaska Department of Natural Resources (ADNR) is a water-level data provider to the National Groundwater Monitoring Network (NGWMN; <https://cida.usgs.gov/ngwmn/>). Funding to support data providers to the National Ground-Water Monitoring Network is provided through USGS Cooperative Agreements. The ADNR collects groundwater data to evaluate changes in groundwater storage and recharge, the interaction between groundwater and surface-water, the response of groundwater systems to climate variability and drought, and the effects of earthquakes on groundwater levels. We will provide an update on current status of monitoring wells and highlights of results to date.

Alaska DNR and Statutory Responsibility

- The Alaska Hydrologic Survey within the Department of Natural Resources is mandated by Alaska Statute (AS) 41.08.017, AS 41.08.020 and Department Order 115 *to collect, record, and require filing of data on the quantity, location and quality of water in the subsurface, surface, or along the coasts.*
- Unfunded mandates
- State's groundwater monitoring program is still in its infancy, only one *water level station* has 5 years or more of data

Methods & Procedures



Office of Groundwater

Groundwater Technical Procedures of the U.S. Geological Survey



Techniques and Methods 1–A1

U.S. Department of the Interior
U.S. Geological Survey

<http://pubs.usgs.gov/tm/>



USGS 645434147385101 FB00100113DDBC2 001 MCGRATH WELL

