

# Alaska Groundwater Monitoring Program

Alaska Hydrologic Survey,  
Alaska Department of Natural Resources  
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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
  - 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
- 2019 TOTAL\*: with combined efforts among local, state, and federal agencies with cooperation from private landowners increased the # of observation wells in Alaska to >23 (~20 state, 4 USGS)

*\*Waller 1966 USGS Paper 544-B “Effects of the March 1964 Alaska Earthquake On the Hydrology of the Anchorage Area”*



# National Groundwater Monitoring Network

USGS Grant awarded to DNR in 2016



## National Ground-Water Monitoring Network

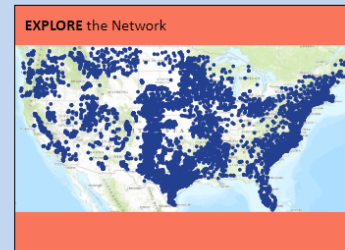
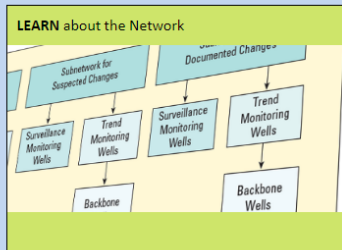
The National Ground-Water Monitoring Network (NGWMN) is a product of the [Subcommittee on Ground Water](#), of the Federal Advisory Committee on Water Information (ACWI). The NGWMN is a compilation of selected groundwater monitoring wells from Federal, State, and local groundwater monitoring networks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



The 1964 Great Al...pdf

Show all

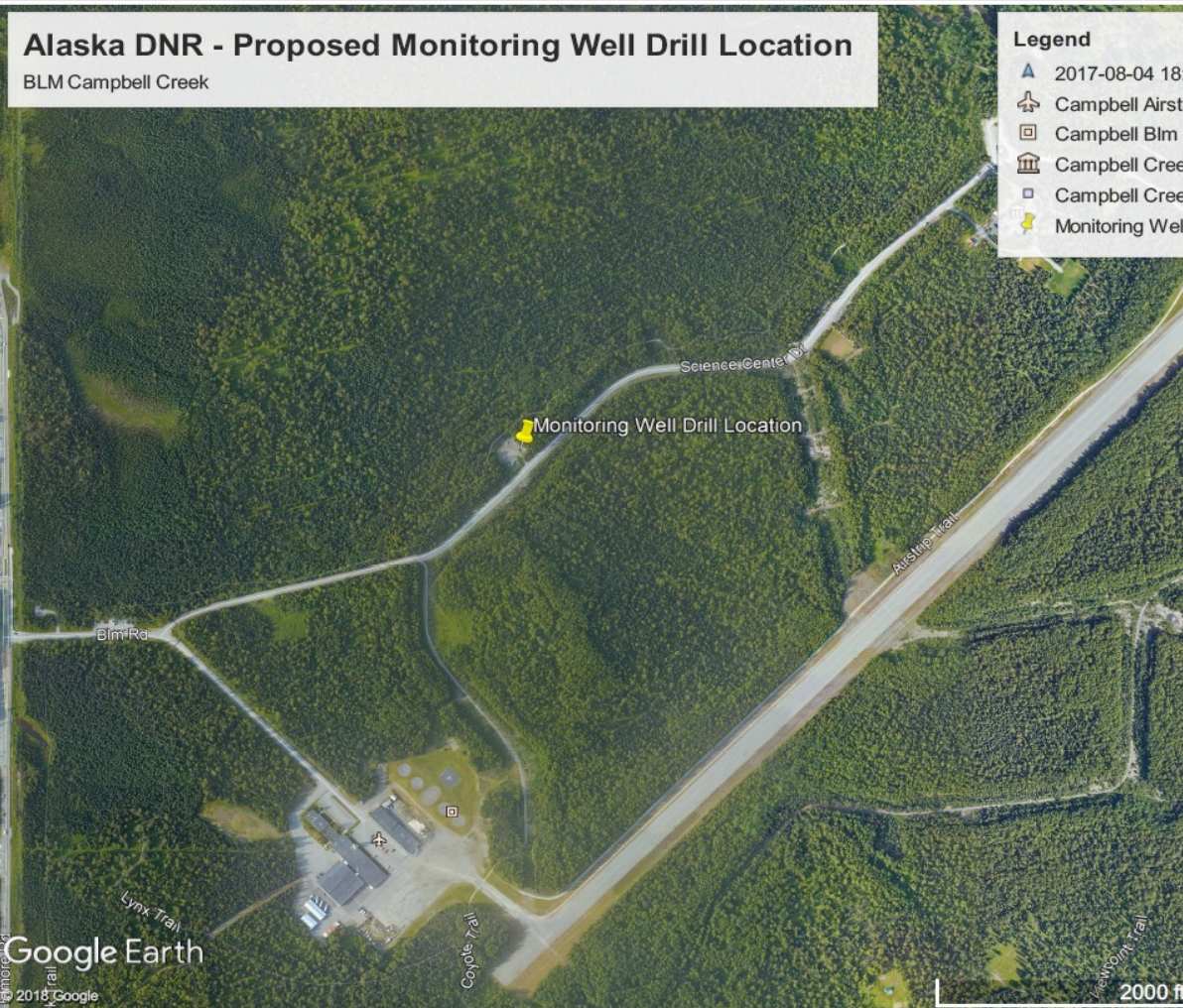
<https://cida.usgs.gov/ngwmn/>

1:12 PM  
9/17/2019



# National Groundwater Monitoring Network

## Drilling a new monitoring well before snow flies!







## Well Log Tracking System (WELTS)

### Search WELTS

Welcome to the Alaska Well Log Tracking System (WELTS)! Alaska Statute 41.08.020(b)(4) and Alaska Administrative Code 11 AAC 93.140(a) requires water well contractors to file water and aquifer data obtained, including but not limited to, well location, well driller's logs, pumping tests and flow measurements, estimated elevation, and water quality determinations **within 45 days of well completion.**

Forms 

Additional Helpful Information

[WELTS User Guide](#) Search: 

Search by key word and choose from suggestion dropdown list or use filter to narrow results

Disclaimer: This page is provided as a public service by the Alaska Division of Mining, Land and Water. The Division makes NO representation regarding well location, completeness or accuracy of the data in the database or data extraction procedures provided. Data are provisional. The user assumes total responsibility for verification.



NGWMN NETWORKS

Water level:  ?

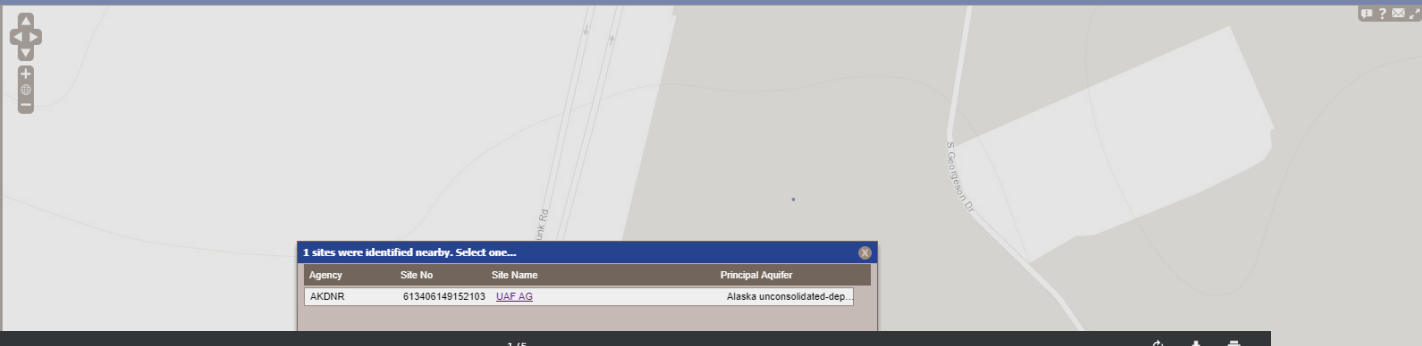
Subnetwork: All, Background, Suspected Changes, Documented Changes

Monitoring Category: All, Surveillance, Trend, Special

Water quality:  ?

Subnetwork: All, Background, Suspected Changes, Documented Changes

Monitoring Category: All



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

6707

WATER WELL LOG Revised 09/19/2016

Drilling Started: / / Completed: 9 / 10 / 1955 Pump Install: / /

City/Borough: Palmer Subdivision: MAT BUS EXPERIMENTAL AG FARM Block: NONE Lot: UNIVERSITY OF ALASKA FAIRBANKS , AK Property Owner Name & Address:

Well location: Latitude: 61.56927 Longitude: 149.23764  
Meridian: S Township: 017N Range: 001E Section: 15 NE 1/4 of SW 1/4 of NE 1/4 of NW 1/4

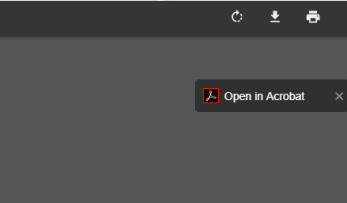
BOREHOLE DATA: (from ground surface)  
Suggest T.M. Hanna's hydrogeologic classification system\*  
[https://my.ngea.org/NC\\_Product7?ma18500000061v63A4](https://my.ngea.org/NC_Product7?ma18500000061v63A4)

Depth	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 CHUNKS AND SMALL PEBBLES	114.0	120.0
CLAY AND SAND GRAY	120.0	123.0
TILL GRAY	123.0	137.0
HEAVING SAND	137.0	154.0

Drilling method:  Air rotary,  Cable tool,  Other  
Well use:  Public supply,  Domestic,  Rejection,  Hydrofracking,  Commercial,  Observation/Monitoring,  Test/Exploratory,  Cooling,  Irrigation/Agriculture,  Grounding,  Recharge/Aquifer Storage,  Heating,  Geothermal Exploration,  Other

Fluids used: \_\_\_\_\_  
Depth of hole: 313 ft Casing stickup: 0.5 ft  
Casing type: STEEL Casing thickness: \_\_\_\_\_ inches  
Casing diameter: 6 inches Casing depth: 310 ft  
Liner type: \_\_\_\_\_ Depth: \_\_\_\_\_ inches  
Liner diameter: \_\_\_\_\_ inches  
Note: CASING DEPTH BASED ON 11/21/2014 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: \_\_\_\_\_ Perf from: \_\_\_\_\_ ft Perf to: \_\_\_\_\_ ft Perf from: \_\_\_\_\_ ft Perf 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: \_\_\_\_\_  
Recovery rate: \_\_\_\_\_ gpm  
GROUT type: \_\_\_\_\_ Volume \_\_\_\_\_  
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 driller name: \_\_\_\_\_  
Company name: RAMSEY  
Mailing address: \_\_\_\_\_



ADDITIONAL DATA ID: \_\_\_\_\_

PERMITTING AGENCY: \_\_\_\_\_

NEW CORRECTION WELL: \_\_\_\_\_

NOTE: Drillers Log

0-3 top soil  
3-5 gravel  
5-9 sand  
9-24 gravel w/ boulders  
24-32 sand clay - brown  
32-38 sand w/ H2O gray  
38-48 fine brown sand  
48-52 fine to coarse gray sand  
52-69 clay w/ streaks of gray sand  
69-74 clay w/ streaks of brn sand  
74-82 sandy gray clay  
82-104 fine gray sand  
104-114 fine sand w/ clay streaks  
114-120 sand w/ clay chunks & small pebbles  
120-123 clay & sand - gray  
123-137 till - gray  
137-154 quicksand  
154-157 silty gr.  
157-165 silty gr. w/ clay streaks  
165-166 hard till  
166-184 clay & sand  
184-206 ind till  
206-256 silty gr. w/ clay streaks  
256-257 sand lenses  
257-264 sand w/ clay streaks  
264-267 ind till  
267-271 till

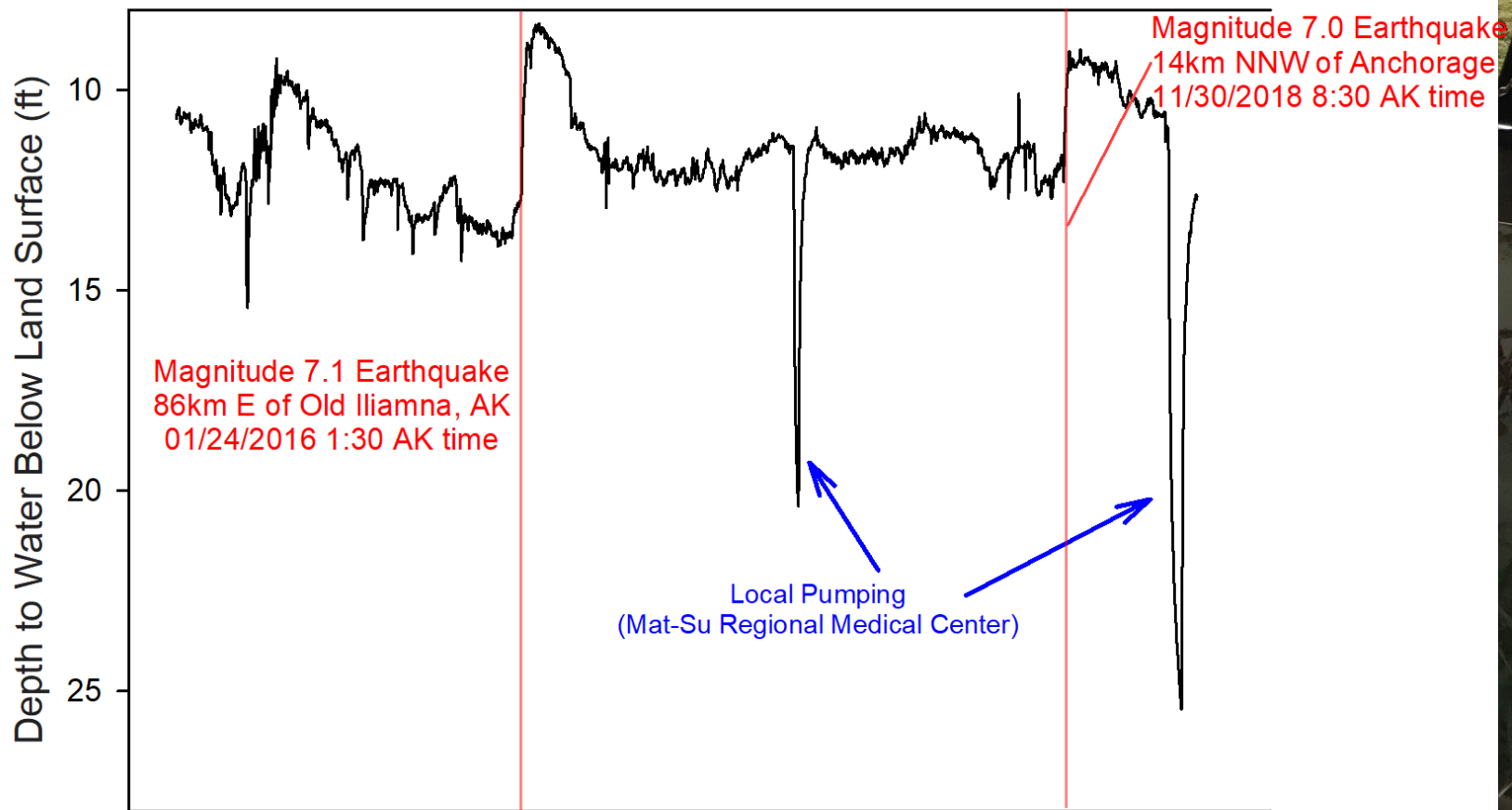
271-279 fine to coarse sand  
279-284 coarse sand - heaved  
284-290 till  
290-291 gr. silty  
291-295 till  
295-298 silty gr.  
298-304 till  
304-306 ind to coarse sand  
306-309 silty chunks & pebbles  
309-310 ind till  
310-313 silty gravel





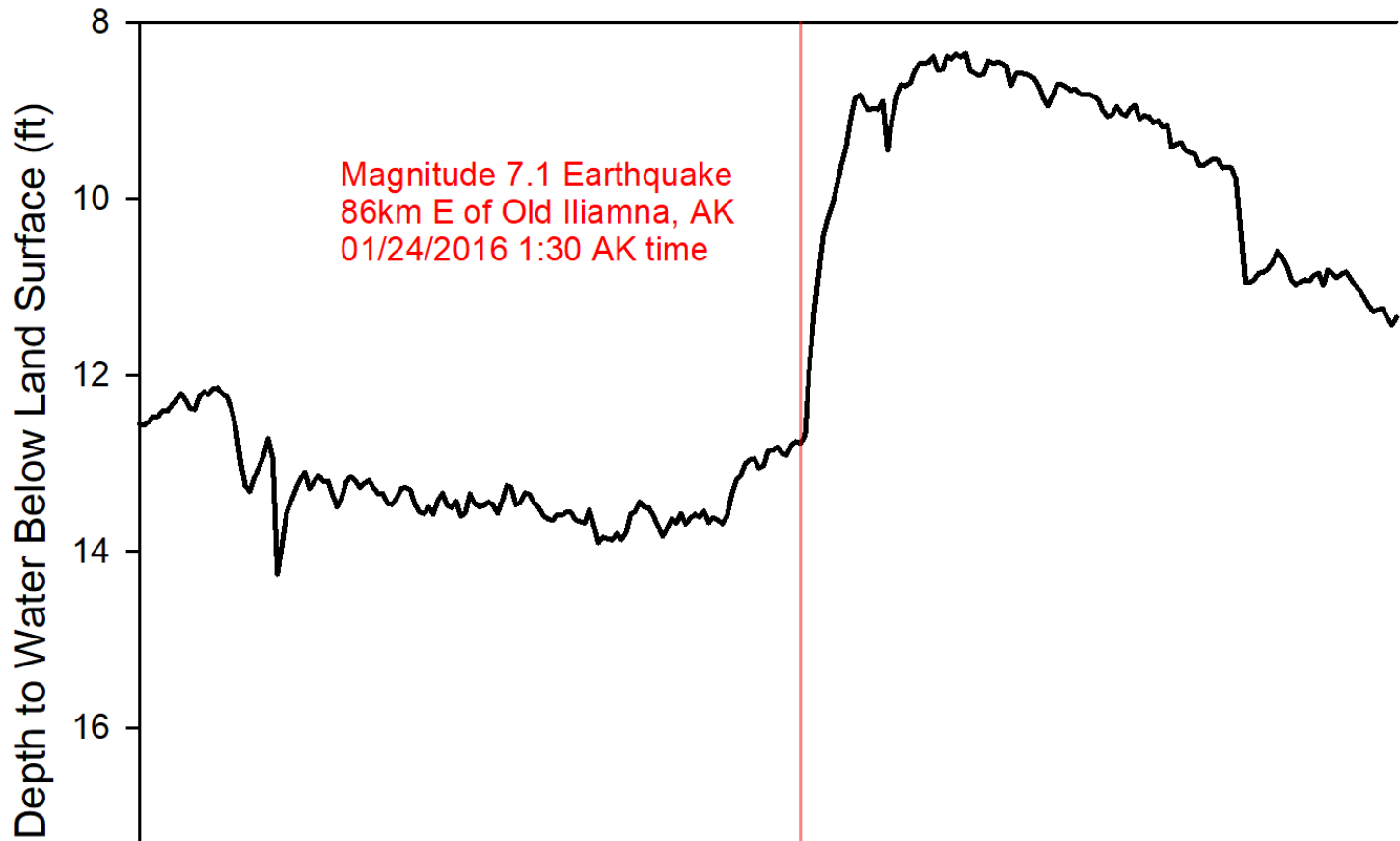
# Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - 2014 to present



# Matanuska Exp Farm Well – Earthquake Response

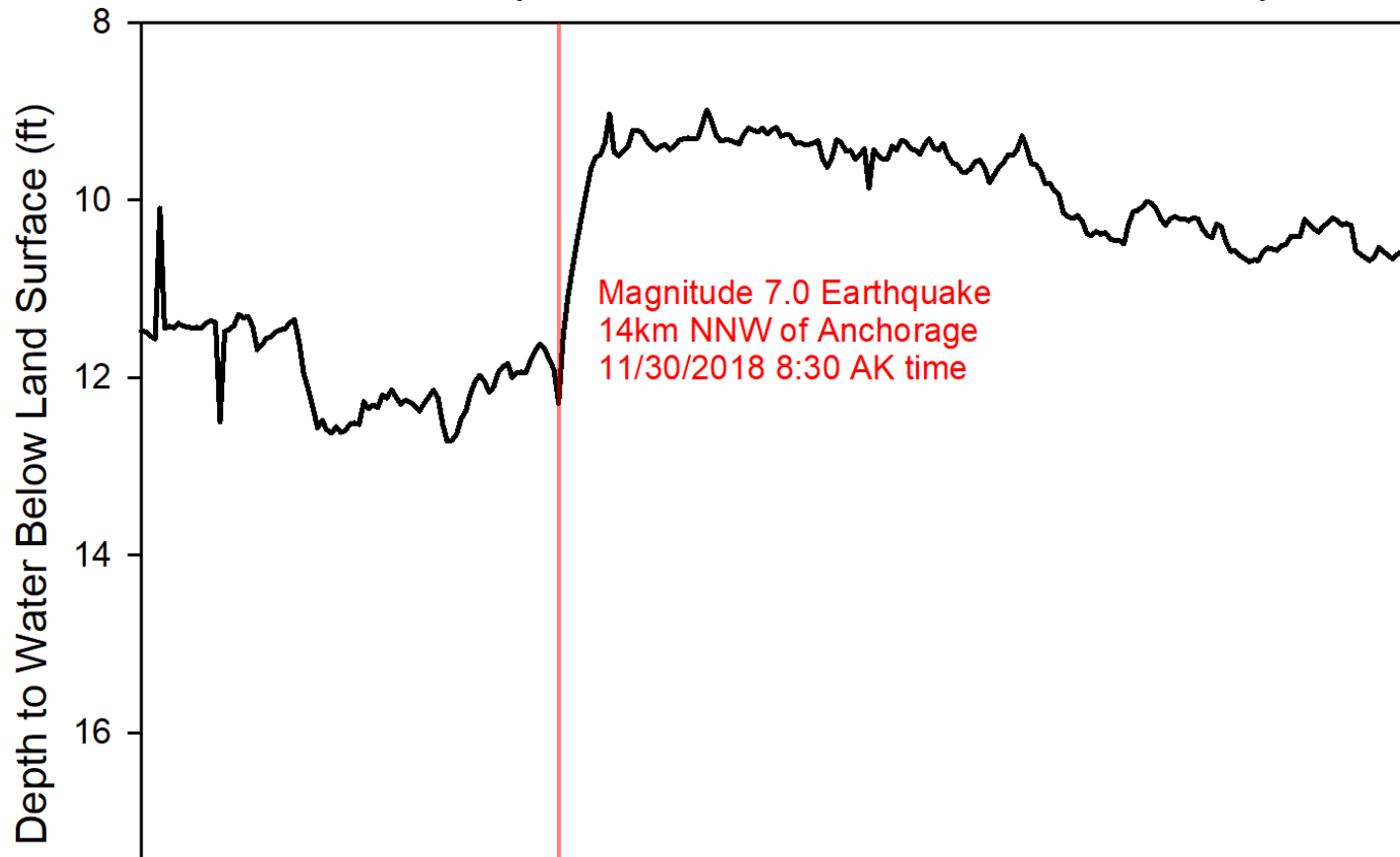
Matanuska Exp Farm Well - Jan 24 2016 Earthquake





# Matanuska Exp Farm Well – Earthquake Response

Matanuska Exp Farm Well - Nov 30 2018 Earthquake



# National Groundwater Monitoring Network

well maintenance





# 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/1a1/>