

2018 M7.0 Anchorage, Alaska, Earthquake

RESPONSE

Date and Time: November 30, 2018, 8:29:29 am
Location: N 61.323°, W 149.923° (7 miles north of Anchorage)

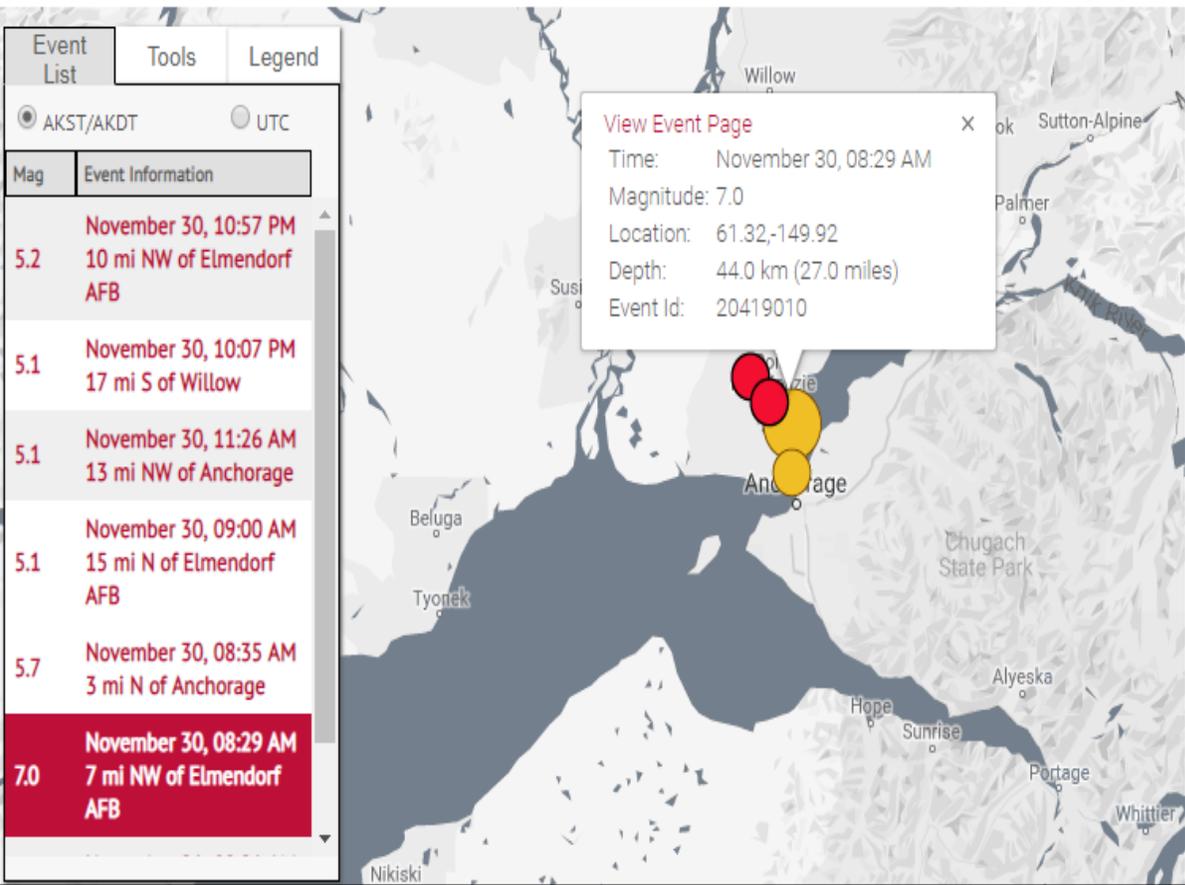
Area of Effect: Strong to very strong shaking felt from northern Kenai Peninsula to Matanuska-Susitna Valley; light to moderate shaking felt throughout southcentral and interior Alaska. Initial earthquake followed 6 minutes later by M5.7 aftershock.

Fatalities: 0
Damage: Power outages and gas leaks; damage to roads, railroads, and buildings; and closures of schools, businesses, and government offices throughout Anchorage bowl and Mat-Su Valley.

Tsunami: Tsunami warnings were sent out within minutes of the earthquake. No tsunami waves reported.



Lateral spreading disrupted Vine Road near Wasilla. Many failures of engineered materials occurred on or adjacent to water-saturated lowlands. (Photo credit: U.S. Geological Survey)



Alaska Seismic Hazard Safety Commission

Alaska Earthquake Center

Points to Ponder

Proximity matters

- The Anchorage earthquake occurred 7 miles north of Anchorage and caused extensive damage, while the 2002 M7.9 Denali earthquake, which occurred about 170 miles north of Anchorage, caused no damage in the area.
- Anchorage population is approximately 325,00, Mat-Su 104,000 & Kenai Borough 50,000= 479,000
 - Entire state population is 710,000

Earthquake-resilient construction saves lives

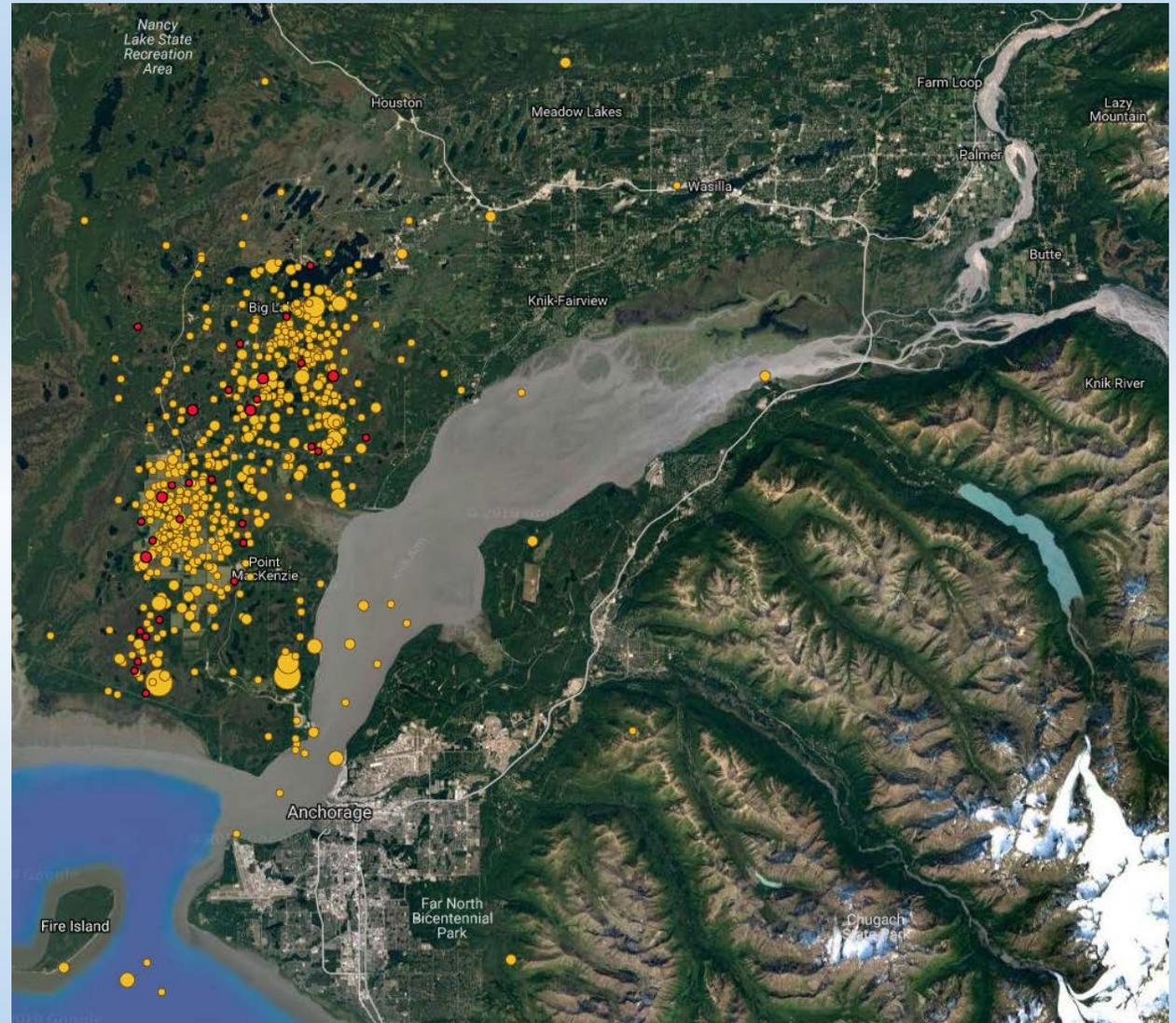
- The population affected by the Anchorage earthquake generally reside in structures built in accordance with seismic building codes or using construction techniques that are resistant to earthquake shaking, and no lives were lost.
- Areas where codes were not enforced saw higher damage as a result

Infrastructure is vulnerable to earthquake damage

- Construction codes for roads and embankments are not as successful as building codes for structures. Roads, railroads, and embankments suffered extensive damage; many were made impassible.
- Port of Alaska receives 84% of all goods for entire state. Current expected lifespan-12 years remaining.

Earthquake preparedness training is effective

- Alaska students followed training and implemented the immediate safety action of *Drop, Cover, and Hold On!*



- <https://www.youtube.com/watch?v=NJZqREPC9k0>



2018 Nov Cook Inlet Earthquake



Situation Brief

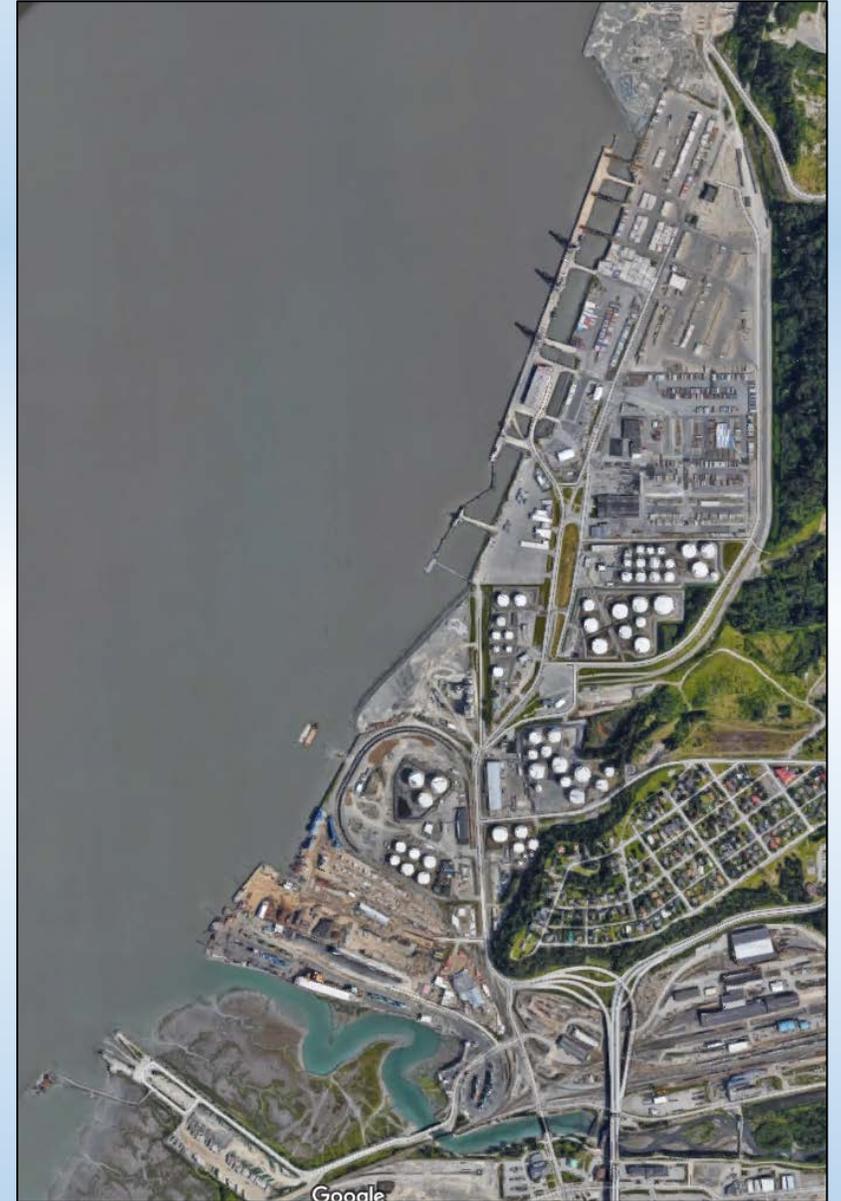
Initial Operational Period

11/30/2018 to



Key Updates

- Governor declared State Disaster and requesting Federal Assistance
- Port of AK
 - COTP – Open
 - Tanker shut-in pending hydrostatic test for fueling
 - Structural assessment at low tide Sat AM
 - Inbound cargo ships expected Sunday & Monday requesting bar survey (USACE pends)
- Hospitals Anchorage & Matsu – Open and accepting patients
- Anchorage International – Operational
- 0 fatalities reported
- Eagan & Dena'ia Centers open as shelter



Current Power Outages

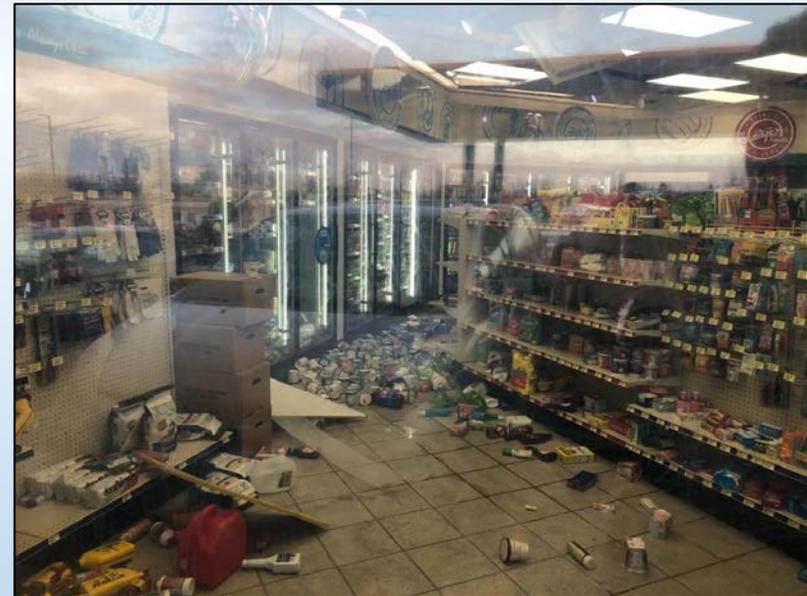
Company	#Out	# Served	%Out
Matanuska Electric Association	30093	64831	 46.42%
Chugack Electric Association	928	68000	 1.36%
Municipal Light & Power			
Homer Electric Association	7	31890	 0.02%

Pipeline Status as of 1220L

- **Alyeska Pipeline** – TAPS shutdown, no problems ID, CC evac'd
- **Enstar Pipeline** - Gas main distribution lines holding pressure, numerous house fires (responders working), no injuries/fatalities
- **Tesoro Alaska Pipeline Company** - Kenai to Anchorage pipeline shutdown and holding pressure. Terminal shut down & evac'd.
- **ASIG** - Jet fuel pipeline is shut down and holding pressure.
- **Hilcorp pipelines** - Shut down and holding pressure, and no damage reported.
- **Titan Alaska** - No damage and LNG plant at Pt. MacKenzie operational. This plant supplies LNG and thus natural gas to Fairbanks. Roads from plant to Fairbanks reported usable and open.

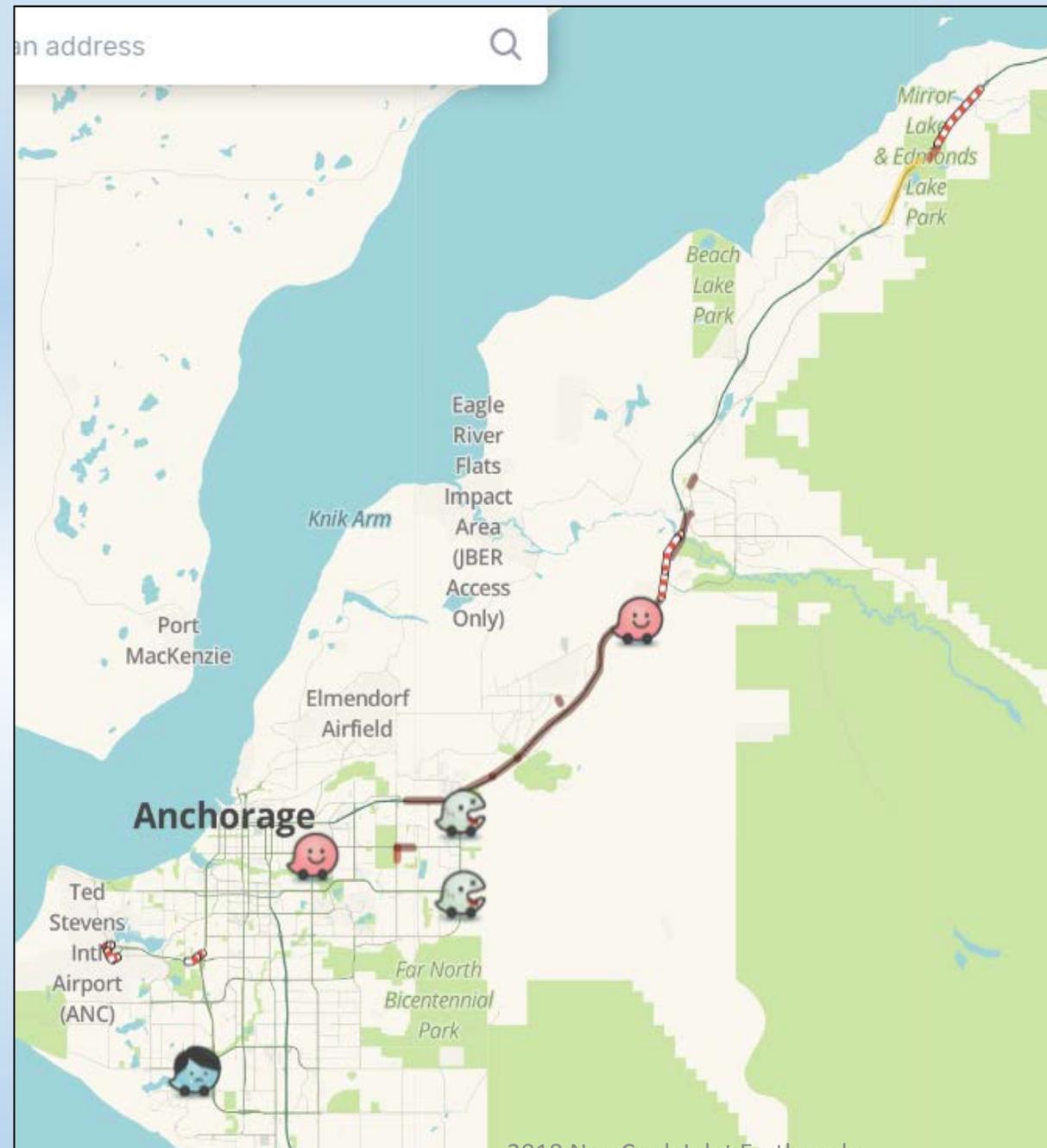
Anchorage Field Reports:

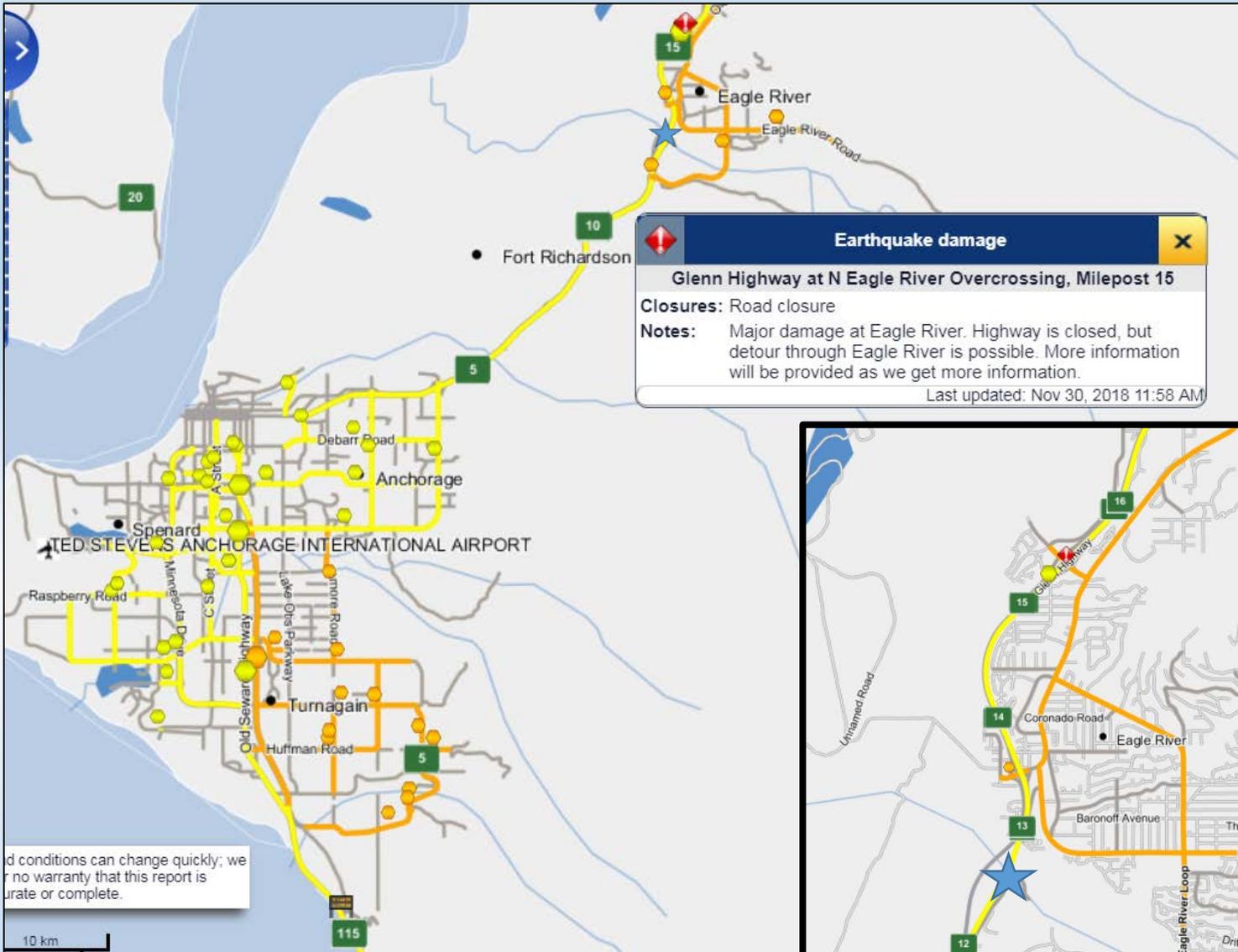
- Anchorage School District closed
- Land/Mud Slide @ McHugh Creek
- 3 CAP in air to respond to distressed individuals (Investigating 2 ELTs)
- Structural Issues
 - Collapse on International Road
 - Structural Fire @ 76th & C St
 - Frontier Bldg structural damage – evac'd
 - Fish & Game bldg. burning on Minnesota
 - Damage to Merrill Field ATC
 - ANC International - Operational
 - Broken water pipes



Anchorage Road Report

- Railroad
 - Closed pending damage assessment
- Road Closures
 - Glenn Hwy @ N Eagle River @ Milepost 15
 - Detour through ER is possible
- Damage
 - Minnesota drive
 - New Seward (rock slides)
 - Eagle River Bridge



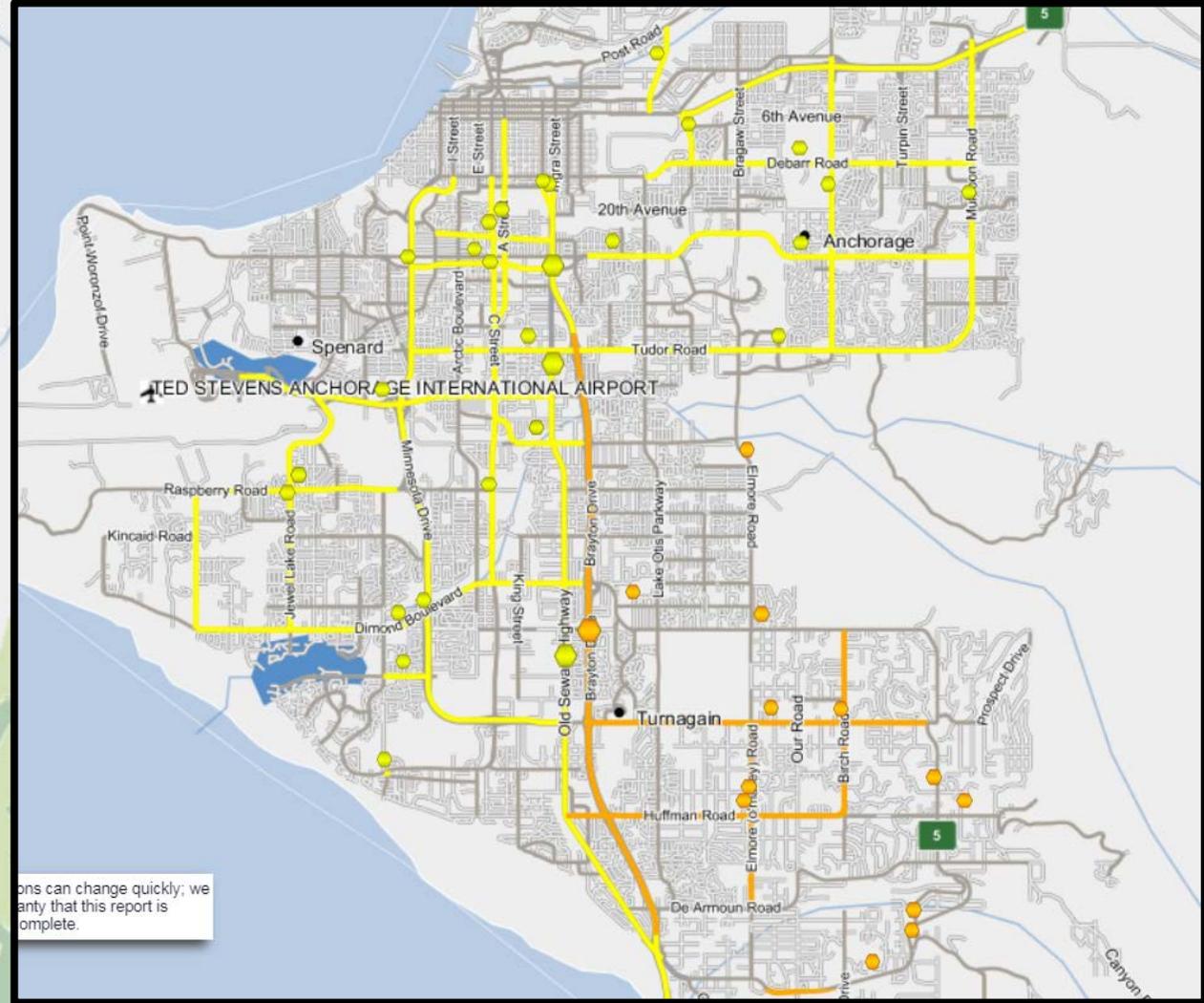


Taken from 511





Taken from 511
 After tsunami warning issued

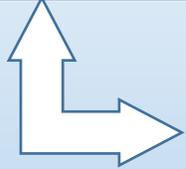
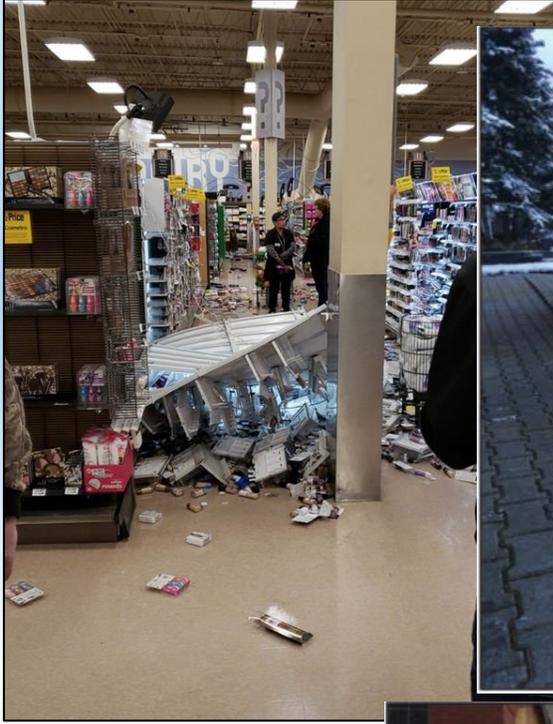


quake

Mat-Su Field Report:

- Several Fire Stations damaged
- Schools closed (shelter in place until parents arrive)
- Gas leaks at schools and homes
- Hospital ready to receive patients
- Road severed
 - Vine Rd
 - Pittman Road





Minnesota Blvd
Airport Off-Ramp

- Based on engineering observations it appears that the majority of infrastructure damage resulting from this event occurred due to geotechnical issues – principally localized liquefaction in the granular fills beneath structures (particularly beneath residential and small commercial structures in swampy areas), slope instabilities in native slopes and anthropogenic fills, and bearing capacity failures in organic soil deposits due to cyclic softening.



EERI Review 2019



2018 Cook Inlet Earthquake

State of Alaska Emergency Operations Center



Current Situation
as of: 12/03/2018 08:00





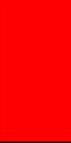
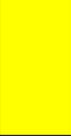
Current Lifeline Status





	<h2 style="text-align: center;">Energy (Power & Fuel)</h2>	
 Power	 Chugach Electric	
	 ML&P	
	 Matanuska Electric	
	 Homer Electric	
 Nat Gas	 ENSTAR	<p>Enstar is reporting no issues with their distribution system. Reporting 250 outstanding service calls.</p>
 Pipelines	 Trans Alaska Pipeline System (TAPS)	



 Transportation		
 Airports		Ted Stevens Int'l Airport
		JBER
		Palmer Airport
		Merrill Field
		Birchwood
 Ports		Port of Alaska Fully operational. Received cargo 12/2/2018
		Port McKenzie Road and rail access to port is limited.
		Seward Port
		Whittier Port
 Railroad		Alaska Railroad (North) North bound rail closed due to reports of damage at mileposts 138 and 170. Repairs are ongoing, Anticipate possibly opening Tuesday.
		Alaska Railroad (South) Traffic re-commenced Sunday evening.
 Highways		Alaska Hwy
		Parks Hwy
		Richardson Hwy
		Glenn Hwy NE (MP 118-189)
		Glenn Hwy SW Traffic flowing with lane limitations.
	Seward Hwy MP 104-114: rock fall continues in this area with continuing aftershocks and settling. DOT&PF recommends avoiding the area.	





 Food, Water, Shelter		
 Shelters		Egan Center Shelter closed at 18:00 12/1/2018.
		Menard Sports Center Shelter closed at 10:00am 12/1/2018.
		Fairview Recreation Center Open and operational, 52 PAX overnight
 Water		Anchorage Water / Waste Water Util Assessing water leaks, no major outages reported, Boil water notice lifted
		City of Wasilla Water System Reporting system functioning normally
 Food		Food retails are resuming normal operations and sales.



 <p>HEALTH AND MEDICAL</p>	<h2>Health and Medical</h2>		
		Hospitals	
		Blood Bank	
		Dialysis	
		Pharmaceutical	
 <p>HAZARDOUS WASTE</p>	<h2>Hazardous Waste</h2>		
 <p>SAFETY AND SECURITY</p>	<h2>Safety and Security</h2>		



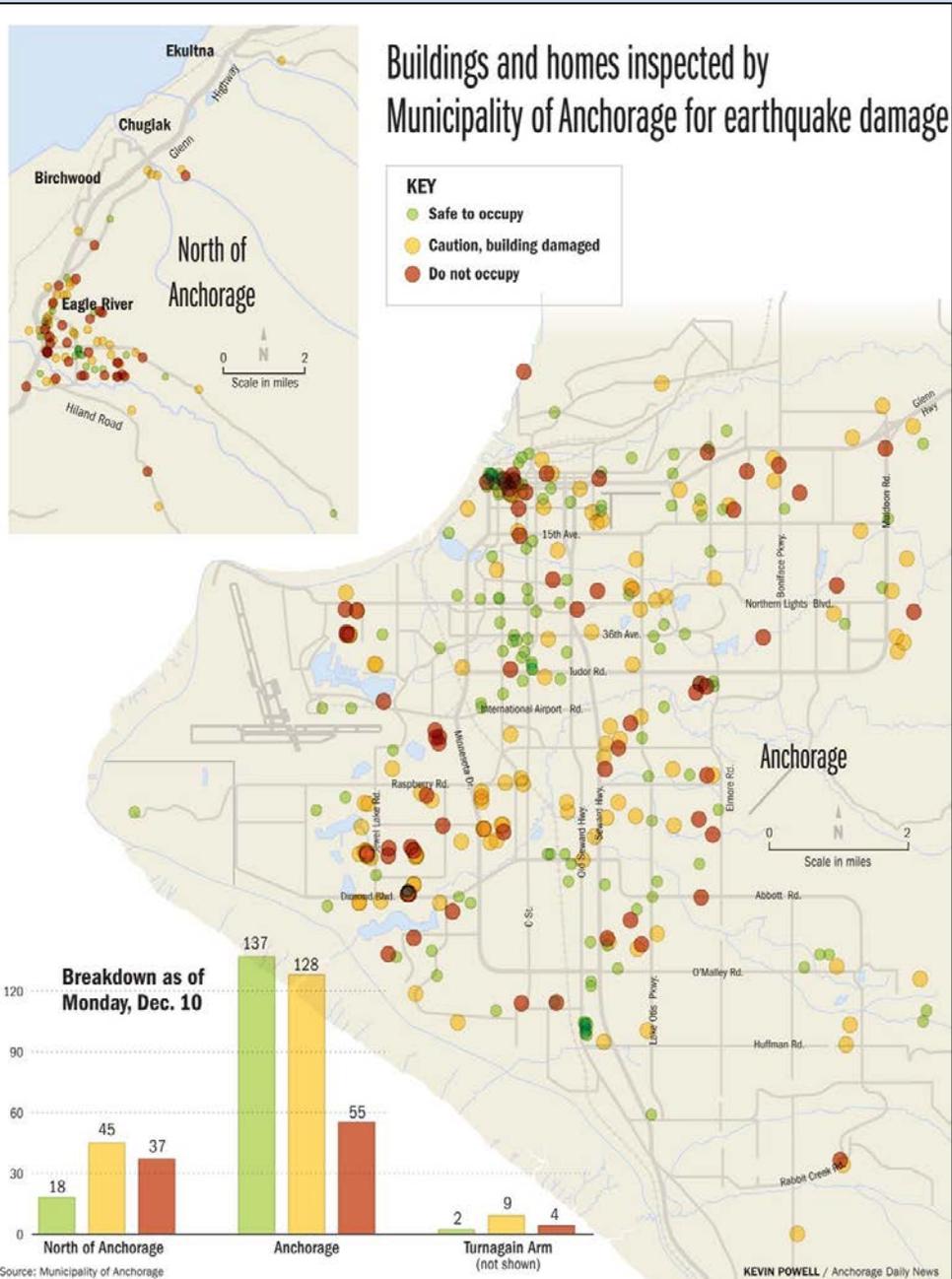
Schools Update

UAA

- ANC, ER and Mat-Su Campuses closed until further notice

ASD and Mat-Su School Districts

- All ASD schools closed until 12/10/2018
- Mat-Su schools closed until 12/5/2018



Poor construction practices- No enforcement



Ground failure





The Rivers Edge Condominiums are seen next to Eagle River on Thursday, Dec. 13, 2018. Eight homes in the development were red-tagged by the municipality due to structural damage that occurred when part of a slope slid into the homes





FEMA

State of Alaska Emergency Operations Center

Operations Briefing

Current Situation
as of: 12/13/2018 08:00

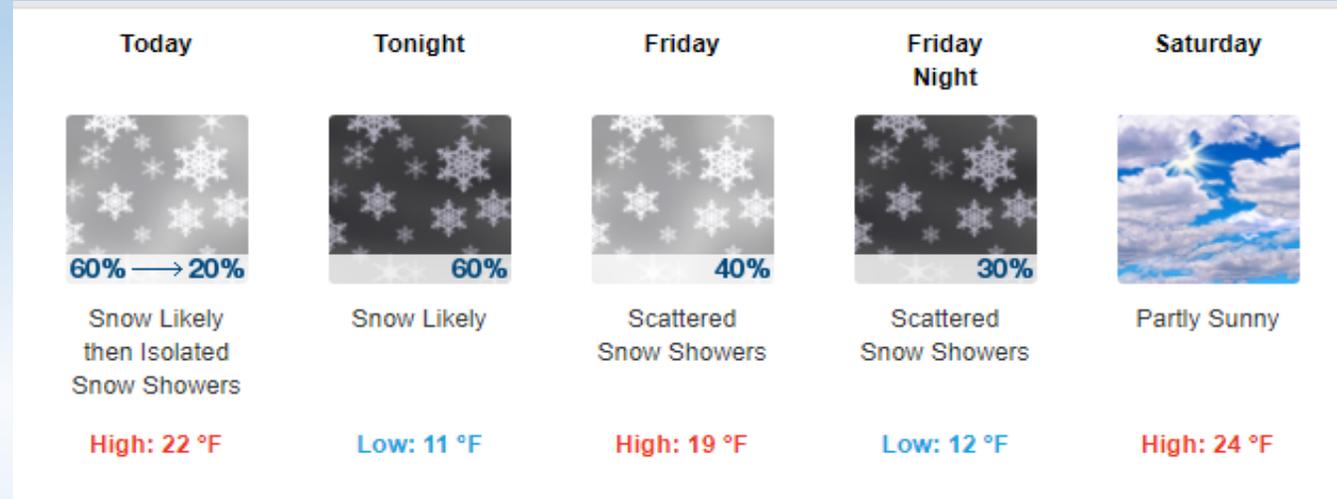


Incident Objectives

Objective Number	Description
1	Ensure the safety and security of responders as well as maximize the protection of public health and welfare.
7a	Conduct life safety & immediate need mass care operations for survivors.
2	Support local emergency response operations through the coordination of information, situational reporting and resource requests.
3	Keep the public, stakeholders and the media informed of response activities.
4	Obtain local damage assessment information - focus on individual and residential damages first, public infrastructure second.
5	Implement State of Alaska Individual Assistance, Public Assistance, and Temporary Housing Programs
6 b	Conduct Joint Preliminary Damage Assessments

0800 Thu
Update

Anchorage Weather



Today	Snow likely before 9am, then isolated snow showers between 9am and 3pm. Mostly cloudy, with a high near 22. Northeast wind around 5 mph becoming east in the afternoon. Chance of precipitation is 60%. Total daytime snow accumulation of less than one inch possible.
Tonight	Snow likely, mainly after midnight. Cloudy, with a low around 11. North wind 5 to 15 mph. Chance of precipitation is 60%. New snow accumulation of around an inch possible.
Friday	Scattered snow showers, mainly after 3pm. Cloudy, with a high near 19. North wind 10 to 15 mph. Chance of precipitation is 40%.
Friday Night	Scattered snow showers. Cloudy, with a low around 12. North wind 10 to 15 mph. Chance of precipitation is 30%.
Saturday	Partly sunny, with a high near 24. North wind around 10 mph.

0800 Thu
Update

Statewide Weather Update

Winter weather advisory until 1500 Thu for snow and blowing snow 1 to 3", and High Surf Advisory for north facing shores through 1800 Thu.





Current Lifeline Status



© Associated Press Photo



<https://www.youtube.com/watch?v=Uq-CIKDL0xM>



State of Alaska Individual Assistance Applications

Matanuska-Susitna Borough and Municipality of Anchorage

- 4600 applications for assistance received

Joint Preliminary Damage Assessments

Matanuska-Susitna Borough and Municipality of Anchorage

- 397 sites visited

Individual Assistance Shelter Recipients

Matanuska-Susitna Borough and Municipality of Anchorage

- 26 housed individuals



FEMA

Incident Commander
 Bryan Fisher (S)
Federal Coordinating Officer
 Willie G. Nunn (F)
 Deputy FCO
 Timothy Manner (F)

Public Information Officer
 Jeremy Zidek (S)
External Affairs Officer
 Crystal Payton (F)
 Assistant PIO
 Michelle Torres (S)
 Logan Stolpe (S)
 Assistant External Affairs
 Officer
 Robert McCulloch (F)

Chief of Staff
 Michael Brockett (F)

Safety Officer
 Michael Drummond (S)

State ADA Advisor
 David Newman (S)

Operations
 Section Chief
 Mark Roberts (S)
 Donald Price (F)
 Deputy
 Operations
 Section Chief
 Charissa Keller (F)

Planning Section Chief
 Jared Woody (S)
 Stewart Matthiesen (F)
 Deputy Planning Section Chief
 Richard Hildreth (S)
 Jeffrey Mckenzie (S)

Logistics Section Chief
 Christine Stroda (S)
 David Bicanovsky (F)
 Deputy Logistics Section
 Chief
 Brent Nichols (S)

Finance & Admin Section Chiefs
 Tiffany Peltier (S)
 Deputy Finance & Admin Section
 Chief
 Adrian Avey (S)

SEE OPS ORG
 CHART

Situation Unit Leaders Brett Schimmack (S)	Resources Unit Leaders Thomas Koloski (S) Corey Royer (F)	Document Unit Leader Josephine Simmons (S) Tonya Cunningham (S)
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Comm Unit Leader Greg Eubank (S)	Service Branch Director Guillermo Cuevas (F)	Support Branch Director Christopher Roberts (F)
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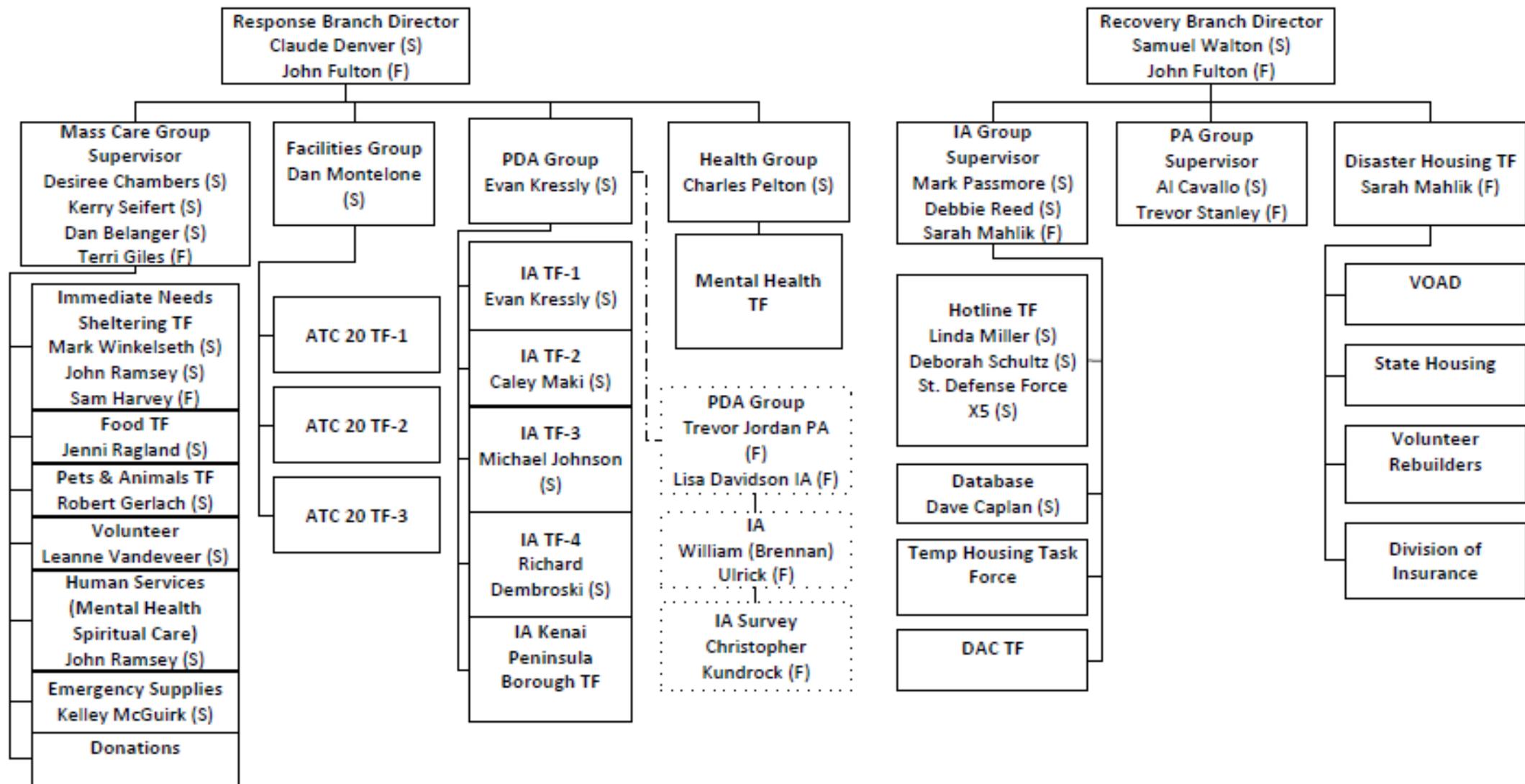
Travel Spc. Elysha Fairclough (S)	Procurement Unit Leader Jessica Umstead (S)	HR Unit Leader Margaret Turpin (F)	Contracting Officer Rich Albidress (F)
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Operations Section Chief
 Mark Roberts (S)
 Donald Price (F)
 Deputy OSC
 Charissa Keller (F)



FEMA



Accurate Information

Anchorage
A big earthquake could send a tsunami up Cook Inlet. Would it reach Anchorage?
 Author: Michelle Theriault Boots | Updated: December 17, 2018 | Published December 12, 2018



Anchorage skyline and tidal mudflats after sunset on Wednesday, Dec. 12, 2018. (Bill Roth / ADN)

Four minutes after a 7.0 earthquake shattered morning routines in Southeast Alaska on Nov. 30, residents got a small warning of a tsunami risk and instructing them to seek higher ground.

The alert was canceled less than an hour later, but not before Anchorage residents called 911 to ask if they should seek higher ground. Of course, it was meant more for coastal communities like Seward and Homer in Anchorage.

But the episode got a lot of people wondering: Could Anchorage be inundated by a tsunami?

Scientists, shy of speaking in absolutes, won't say it is impossible, but extremely unlikely.

"We cannot say the probability is zero -- but it is a very small probability," said David Hale, an oceanographer with the National Tsunami Warning Center in Hilo, Hawaii.

A text warning of tsunami danger was sent out Nov. 30, 2018 after the 7.0 earthquake in Southeast Alaska. (Bill Roth / ADN)

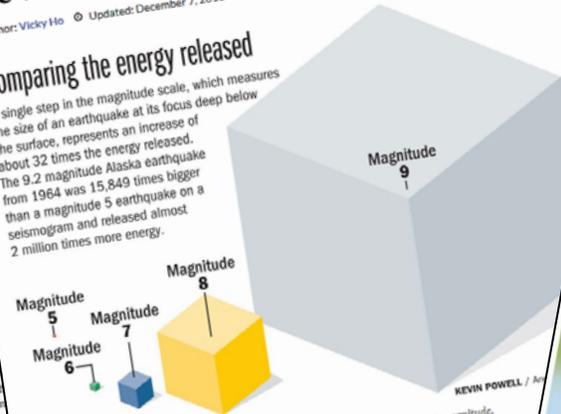
8:36
 Friday, November 30

EMERGENCY ALERTS
Emergency Alert
 Tsunami danger on the coast. Go to high ground or move inland. Listen to local news. -NWS

Alaska News
Size vs. strength: Comparing earthquakes
 Author: Vicky Ho | Updated: December 7, 2018 | Published December 6, 2018

Comparing the energy released

A single step in the magnitude scale, which measures the size of an earthquake at its focus deep below the surface, represents an increase of about 32 times the energy released. The 9.2 magnitude Alaska earthquake from 1964 was 15,849 times bigger than a magnitude 5 earthquake on a seismogram and released almost 2 million times more energy.



Sources: USGS; Geophysical Institute, University of Alaska Fairbanks

Here's a handy visualization comparing the energy released by earthquakes of different magnitude.

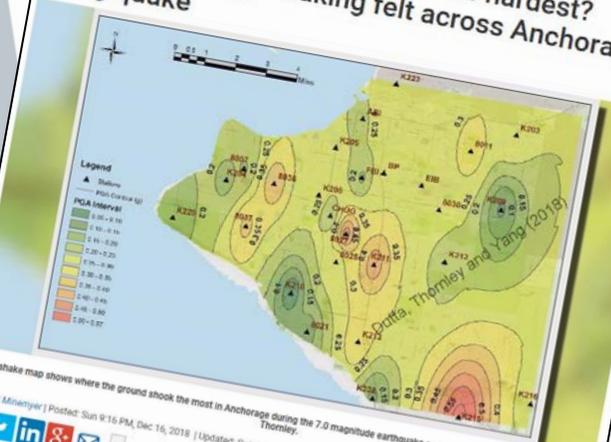
Back-to-back aftershocks — with preliminary magnitudes of 4.8 and 4.1 — jolted Southeast Alaska around 12:45 p.m. Thursday, in case we weren't already jumpy enough.

But just how do those stronger aftershocks compare with last week's magnitude 7.0?

Magnitude 7.0 is 32 times more powerful than magnitude 6.0, and 1,024 times more powerful than magnitude 4.0. Magnitude, according to the USGS, is a logarithmic scale.

KTUU
 Home / Accidents / Article

Were you in an area that shook the hardest? Researchers map shaking felt across Anchorage



A shake map shows where the ground shook the most in Anchorage during the 7.0 magnitude earthquake on Nov. 30. Image courtesy of John Thomey.

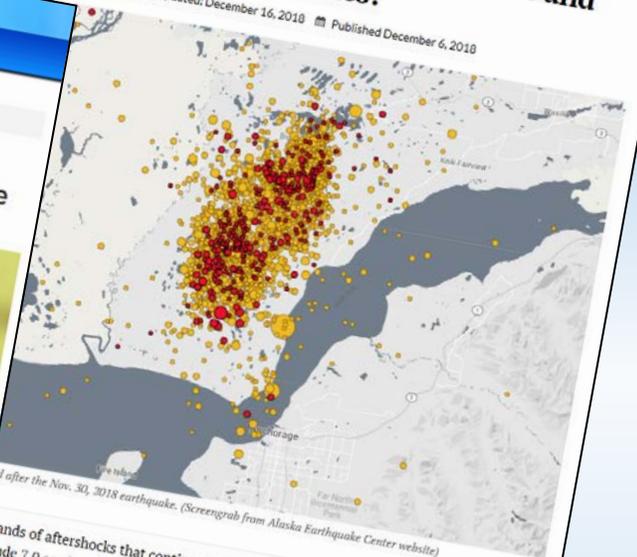
By Derek Minnerly | Posted: Sun 9:16 PM, Dec 16, 2018 | Updated: Sun 11:27 PM, Dec 16, 2018

ANCHORAGE (KTUU) - Data gathered in the aftermath of last month's earthquake is helping to minimize structural damage in future events, according to a geotechnical engineer.

That engineer is John Thomey, who wears many hats, including serving as geotechnical engineer for Golder Associates and chair of the Geo-Technical Advisory Commission for the Municipality of Anchorage.

He's also working on a Doctorate in earthquake engineering, focused specifically on Anchorage's geological response to seismic events.

Science
When do tremors stop being aftershocks and start being new earthquakes?
 Author: Madeline McGee | Updated: December 16, 2018 | Published December 6, 2018



Thousands of aftershocks that continue to rattle Anchorage and Mat-Su after Friday's magnitude 7.0 earthquake have been too small to feel. Others have sent rocks cascading onto Seward Highway. Some shook residents awake, like the 4.7 aftershock that struck 9 miles from Anchorage around 3:49 a.m. Wednesday.

Back-to-back, like the two aftershocks around 12:45 p.m. Thursday that jolted Southeast Alaska with preliminary magnitudes of 4.8 and 4.1.



Public Information

Key Messages

- Do not walk or climb on damaged ground or enter severely damaged buildings until they have been inspected by a qualified inspector. Ground may be unstable and shift if walked or climbed on. Damaged building may contain falling hazards objects and/or collapse if stress is put upon the weakened structure.
- Aftershocks will continue to occur. Be prepared to drop, cover and hold on and follow the direction of local officials to remain safe.
- Public safety is our highest priority but you may be the help until help arrives. If it is safe, check on your neighbors who may require assistance such as infants, children, older adults, people with disabilities and others with access and functional needs.



Public Information

Key Messages

- Donations -Those who wish to donate are asked to donate cash. Material donations must be managed and may not be need by disaster victims when they are donated. Cash can be used to meet most disaster survivors needs and is the most versatile type of donation.
- If you have applied for disaster assistance and it is for personnel property, please be patient as we are working with those applicants who's homes have been made unlivable.



Current Status

Individual Assistance Applications- Matanuska-Susitna Borough and Municipality of Anchorage
12,600 applications for assistance received

Preliminary Damage Assessments- 832 sites visited

Current damage estimates- \$76 million (expected to double)
Updated 1/29 \$130 million



Dealing with Misconceptions

- That wasn't so bad
- I survived a 7.0
- Government didn't help
- Everything is back to normal
- EQ insurance good/bad?

Reality

- We got lucky- consider this your warning
 - If this lasted as long as the 1964 event- we would be dealing with major loss of life and infrastructure
- Anchorage is a single point of failure for entire state
- Impacts will be long lasting and impact for years
 - Many signs of PTSD starting to be reported
- Building codes and enforcement worked and saved lives
- Education is still best action to take!



Here is the big question-
What will be discovered when the snow melts in the spring?