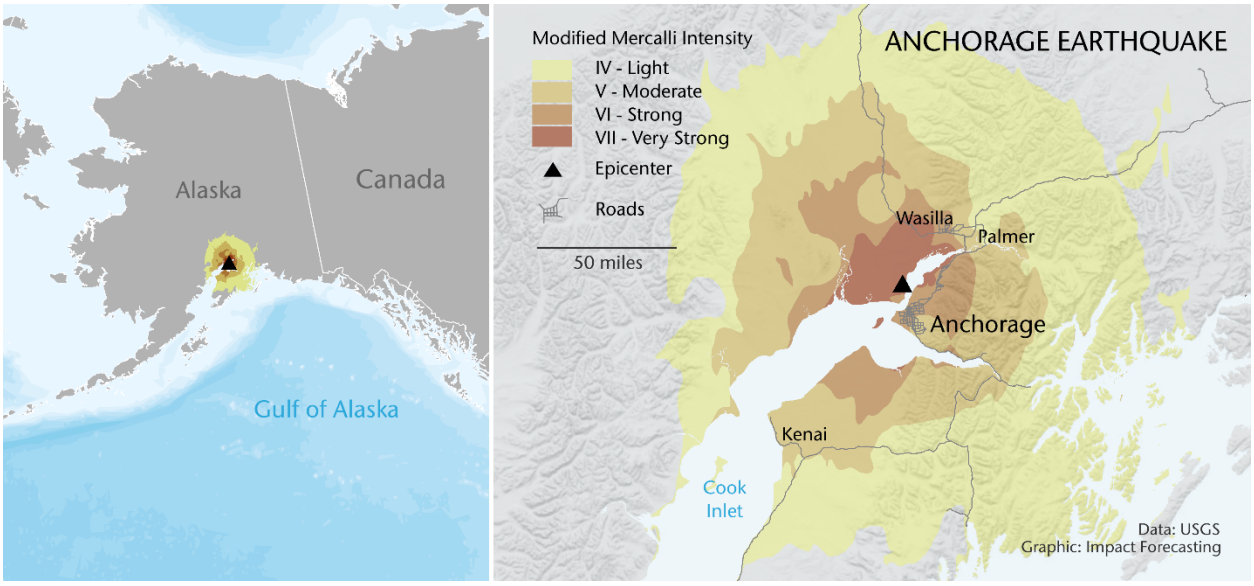
Major M7.0 earthquake strikes near Anchorage, Alaska

A major magnitude-7.0 earthquake struck just north of Anchorage, Alaska on November 30, causing widespread damage to residential and commercial property in addition to local transportation and utility infrastructure. A state of emergency was declared for the Anchorage metro region. There were no immediate reports of direct fatalities or serious injuries. The tremor struck at 8:29 AM local time (17:29 UTC) with an epicenter located 13 kilometers (8 miles) northwest of Anchorage, Alaska. The event occurred at a depth of 40.9 kilometers (25.4 miles), which allowed for strong ground shaking and the possibility of liquefaction to be registered at the surface. Dozens of aftershocks were recorded, including three stronger than magnitude-5.0. The Pacific Tsunami Warning Center initially issued a Tsunami Warning but it was later lifted without incident. The USGS cited a 60 percent probability of total economic damage exceeding USD100 million, and a 25 percent probability of damage exceeding USD1 billion.

Seismological Recap



A USGS-registered magnitude-7.0 earthquake struck just north of Anchorage, Alaska in the United States during the morning hours of November 30. The temblor struck at 8:29 AM local time (17:29 UTC) with an epicenter located 13 kilometers (8 miles) northwest of Anchorage, Alaska. The event occurred at a depth of 40.9 kilometers (25.4 miles), and was widely felt across Alaska and elsewhere in North America.

The USGS has provided the official seismological recap of the event:

The November 30, 2018, M7.0 earthquake near Anchorage, Alaska, occurred as the result of normal faulting at a depth of about 40 kilometers. Focal mechanism solutions for the event indicate slip occurred on a moderately dipping fault striking north-south (dipping either to the east at about 30 degrees, or the west at about 60 degrees). At the location of this earthquake, the Pacific plate is moving towards the northwest with respect to the North America plate at about 57 millimeters/year, subducting beneath Alaska at the Alaska-Aleutians Trench, approximately 150 km south-southeast of this event. The location and mechanism of this earthquake indicate rupture occurred on an intraslab fault within the subducting Pacific slab, rather than on the shallower thrust-faulting interface between these two plates.

Earthquakes are common in this region. Over the past century, 14 other M6+ earthquakes have occurred within 150 kilometers of the November 30, 2018 event. Two of these – a M6.6 earthquake in July 1983 and a M6.4 event in September 1983 – were at a similarly shallow depth and caused damage in the region of Valdez. The M9.2 great Alaska earthquake of March 1964, was an interface thrust faulting earthquake that ruptured over several hundred kilometers between Anchorage and the Alaska-Aleutians trench, and to the southwest."

Below is the number of people exposed to shaking based on the Modified Mercalli Intensity (MMI) Scale:

Intensity	Exposed Population	Intensity	Exposed Population
II-III (Weak)	0	VII (Very strong)	125,000
IV (Light)	10,000	VIII (Severe)	4,000
V (Moderate)	87,000	IX (Violent)	0
VI (Strong)	222,000	X (Extreme)	0

Source: USGS

Event Details

Preliminary assessments across the Anchorage metro region and in neighboring cities such as Wasilla, Palmer, and elsewhere on the Kenai Peninsula indicated varying levels of damage to residential and commercial property in addition to infrastructure (transportation and utility). No fatalities or serious injuries were immediately reported.

Local officials in Anchorage reported significant and widespread damage across the entire metro region, which prompted a civil disaster declaration to enact access to state resources, including the National Guard. Officials opened an Anchorage convention center to be used as an emergency shelter. The Alaska Department of Transportation noted that severe damage had occurred to roads and highways across the region due to severe buckling and/or cracking. A high volume of landslides and a rockslide additionally left debris strewn across numerous roadways. Some of the highest profile transportation grid damage locations included the Seward Highway, Glenn Highway, Vine Road, Northbound Eagle River Bridge, the Parks/Glenn Interchange, and an onramp at the interchange of the International Airport Road and Minnesota Boulevard.

Anchorage International Airport was temporarily closed after glass and light fixtures were broken and infrastructure damage leading into the airport was noted. A few water main pipes also burst. However, full operations were resumed within two hours of the mainshock occurring after it was determined that the runway and air traffic control tower were largely unscathed.

Alaska Railroad shut down all operations due to severe damage at the railroad's primary Anchorage Operations Center. Most of the damage to the facility was incurred due to flooding from burst pipes and a loss of electricity.

Anchorage Water and Wastewater Utility noted that there were multiple water main breaks across the city and it advised local residents to boil water prior to consuming. At the peak of the event, roughly 50,000 customers were without electricity in Alaska.

Road damage in Anchorage (Source: Alertnet)

Assessments remained in their infancy as of this writing as officials continued to determine the scale of structural damage that may have occurred in Anchorage, Wasilla, Palmer, Tok, Valdez, and elsewhere. There were no immediate reports of collapsed buildings, though many homes and businesses reported cracking, fallen facades, and broken windows. Much of the damage was attributed to flooding from burst water pipes or fallen ceiling tiles. Many homes and businesses – such as grocery stores – cited damage resulting from fallen indoor contents.

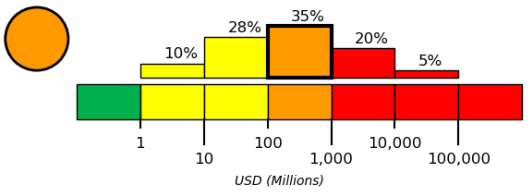
The USGS reports that due to Alaska's proneness to seismic events, many structures in the state are resistant to earthquake shaking. However, there do remain a notable portion of vulnerable structures. Most of those building types include unreinforced brick masonry and reinforced masonry construction.

Anchorage's school system canceled all classes as engineers worked to determine if any buildings had sustained damage or smelled leaking gas. The Trans Alaska Pipeline System was temporarily shut down as a precaution to allow crews an opportunity to assess any physical damage.

As seen in the graphic above, multiple powerful earthquakes have struck near Anchorage and caused damage. The most notable was the March 28, 1964 magnitude-9.2 event which caused an estimated USD2.85 billion in economic damage (2018 USD). That event is the strongest earthquake ever recorded in the United States. However, Alaska typically averages around 40,000 earthquakes per year – more than the other 49 states in the U.S. combined – and the vast majority of these events occur in primarily rural areas. Only a very small number of Alaskan earthquakes cause widespread physical damage.

Financial Loss

Given the ongoing nature of assessments, it remains too preliminary to provide a specific economic or insured loss estimate at this time. The USGS Population Pager cites a 60 percent probability of total economic damage exceeding USD100 million, and a 25 percent probability of damage exceeding USD1 billion.



Additional and updated details will be found in this week's Weekly Cat Report.

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