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NEWS

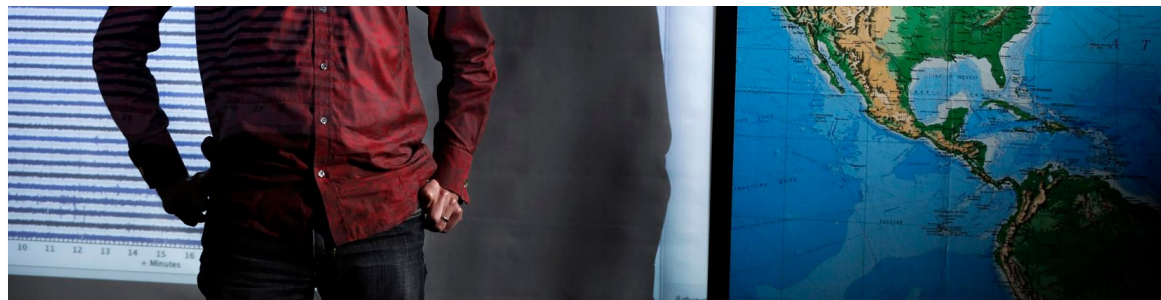
'Bored' seismologists find a new hobby: tracking silence

The Dallas-Fort Worth area registered a 30 percent drop in urban noise since COVID-19 lockdowns began in late March, an SMU study finds.



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SMU seismologist Stephen Arrowsmith charted noise levels across the Dallas-Fort Worth area from before COVID-19 restrictions were enacted to the present. (Tom Fox / Staff Photographer)

By [Anna Kuchment](#)

2:59 PM on May 21, 2020



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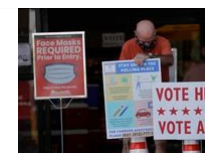
TODAY'S EPAPER

If you've been noticing more birds chirping and more frogs singing, it's probably not your imagination.

Noise created by humans, such as car and truck traffic, quieted by about 30% between late March, when Gov. Greg Abbott closed schools and restaurants across Texas, and early May, according to a new analysis by researchers at Southern Methodist University.

"There was quite a big change in some areas," said Stephen Arrowsmith, a seismologist at SMU, who took on the project with a class of undergraduate and graduate students this spring.

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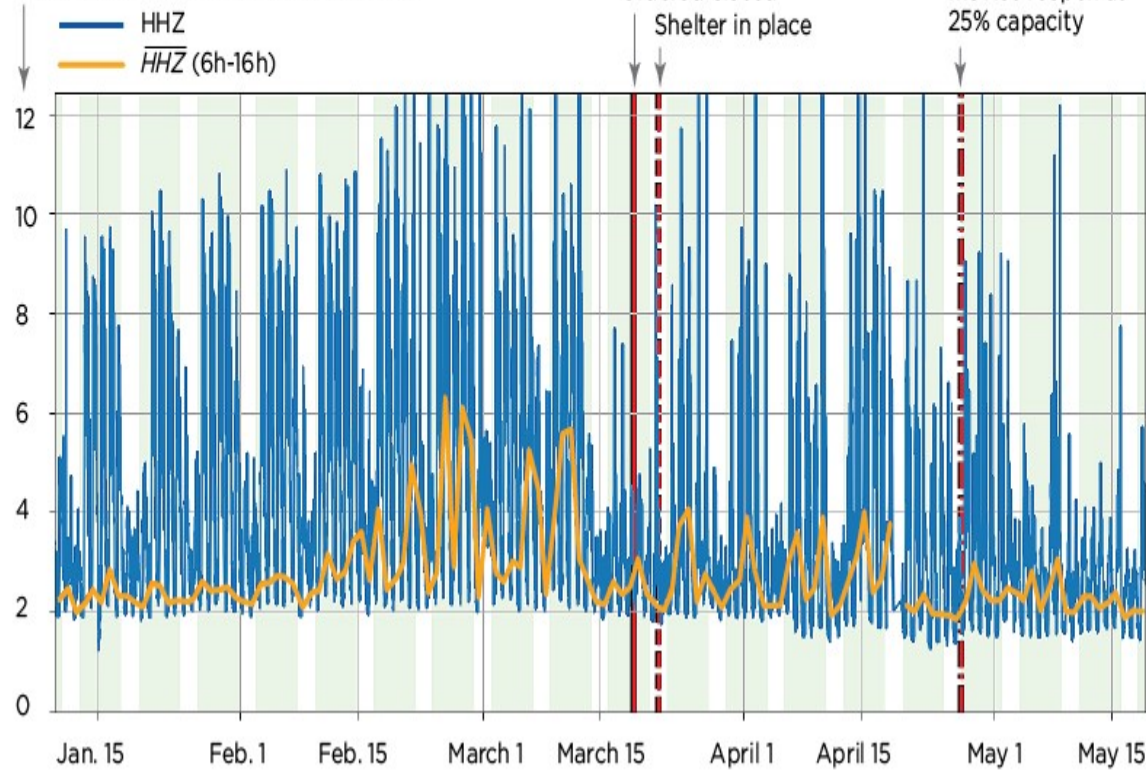


Quiet campus

A seismic station on the Richardson campus of UT Dallas recorded a drop in noise levels as students and faculty stopped driving to campus and parking in a nearby lot, said SMU Professor Stephen Arrowsmith. Because the campus remains shut down, noise levels have not rebounded since stay-at-home orders were lifted.

SEISMIC NOISE

Displacement (nm) with filter 10-40 Hz



SOURCE: SMU Earth Sciences Associate Professor Stephen Arrowsmith

Staff Graphic

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Arrowsmith and his students looked at data from a dozen seismometers across North Texas, including in Irving, Dallas, Farmers Branch,

Richardson and Fort Worth. Seismometers are used to detect earthquakes, but they are sensitive to just about everything that makes the ground vibrate, such as strong winds, ocean waves, passing trains, construction and traffic.

Each instrument contains a small weight on a spring. As the earth moves, the weight remains in place, allowing the seismometer to measure the amount of movement relative to the weight.

Scientists usually avoid placing seismometers in cities, because the racket of human activity makes earthquake signals hard to detect. But North Texas is an exception.

Scientists at SMU and at the University of Texas at Austin's Bureau of Economic Geology placed seismometers in the Dallas-Fort Worth area after Texas experienced a surge of small to moderate-sized quakes beginning in 2013. Many of the stations are now part of the state-wide TexNet seismic monitoring program. Researchers linked the North Texas quakes, which peaked in 2015 before dying down, to oil and gas activity.

Arrowsmith and his students saw a range of noise reductions at the various stations. The biggest changes, perhaps not surprisingly, occurred on college campuses. At the University of Texas at Dallas' campus in Richardson, a TexNet seismic station registered students' comings and goings as classes started and ended each weekday.

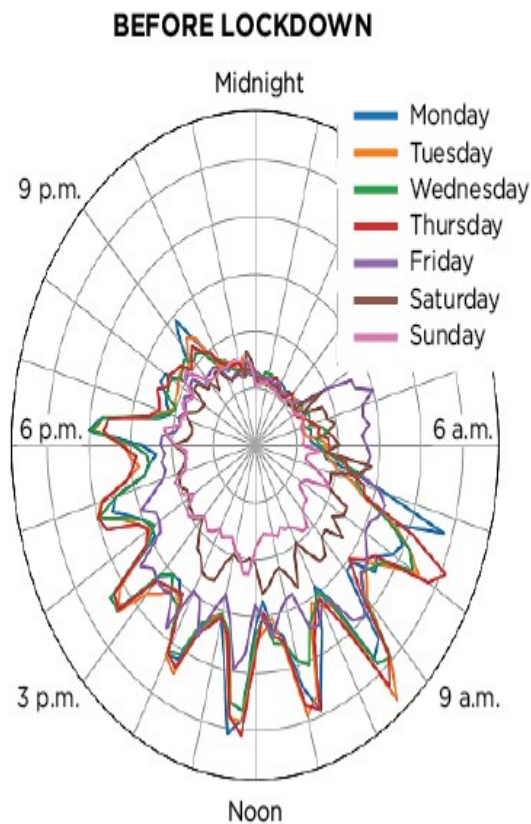
"After the shutdown, that totally disappears, and the background noise

goes way down,” Arrowsmith said.

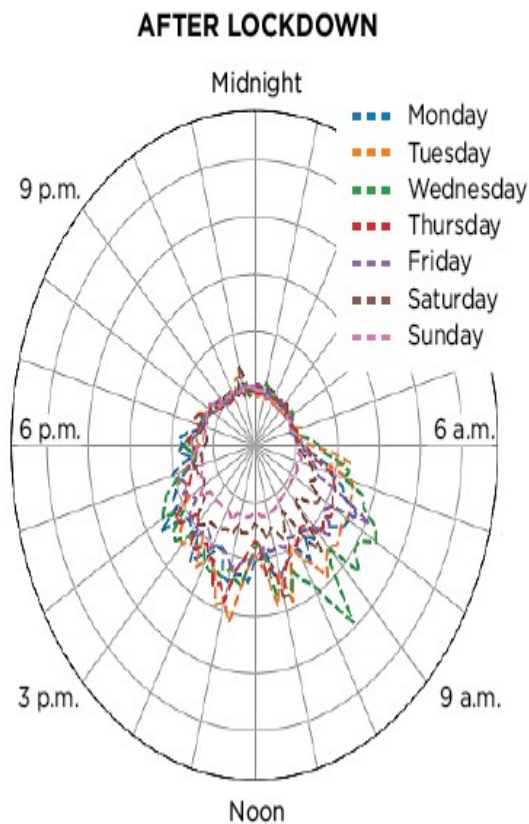
No rush hours

The same seismic station at UTD showed clear daily and weekly noise patterns before the lockdown. The campus reverberated with activity on weekdays between about 7:30 am and 6:30 pm and fell quiet on weekends. Post-lockdown, these patterns became muted.

MEDIAN NOISE LEVELS



SOURCE: SMU Earth Sciences Associate Professor Stephen Arrowsmith



Staff Graphic

Stations in Irving also registered significant noise reductions, mostly

likely due to fewer cars and trucks on the roads, he said.

A seismic station at a firehouse near Farmers Branch, though, registered no change in noise levels, presumably because first responders have remained active throughout the pandemic.

“Each station is telling you about quite local things that are going on near that station,” Arrowsmith said. “So you need a good network of stations to fully understand what the effect of the shutdown is on a city as a whole.”

The idea of using seismometers to track urban noise gained popularity in March when Belgian seismologist Thomas Lecocq posted some of his urban noise data from Brussels on Twitter.

Lecocq, of the Royal Observatory of Belgium, received such an overwhelming response from scientists that he launched the group “Lockdown Seismology” on the Slack communications platform. “It’s where bored seismologists around the world are collaborating,” Arrowsmith joked.

Lecocq wrote in an email to *The News* that he wanted to document the noise levels to show how small changes in personal behavior can make an international impact.

Cities have seen a wide range of noise reductions, ranging from 20

percent to 90 percent, Lecocq said. Dallas has seen among the smaller reductions, Arrowsmith said, which he attributes to stricter lockdown measures in Europe.



PUBLIC HEALTH

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BY WIRE SERVICES AND TOM STEELE

He's working to correlate noise levels with mobility data from companies that use cell phone signals to track how far people travel and how much they interact with one another.

Now that Texas has loosened restrictions and businesses have started to reopen, noise levels have crept up but have not yet reached pre-shutdown levels, Arrowsmith said.

He hopes his findings will contribute to a growing list of creative ways in which researchers are using seismometers. In his spring forensic seismology course Arrowsmith teaches students how seismic stations can help investigators solve crimes like terrorist bombings, aid scientists in tracking nuclear tests in countries like North Korea, or assist inspectors in investigating accidents like space shuttle explosions and chemical plant blasts.

Recently, researchers have begun using seismic stations to track storms

over the ocean, because large crashing waves register on the instruments, too.

Seismic Noise Before and After Coronavirus Lockdown #UTD ...



Even in Dallas seismometers can clearly register sounds from the Atlantic Ocean, Arrowsmith said.

One potential application of his research is to better understand the shallow layers of Earth beneath cities. “That could be useful in places where there’s a real seismic hazard like San Francisco or Los Angeles,” he said, “where just knowing what that shallow structure is tells you a lot about how it would respond in a big earthquake.”



Anna Kuchment. Anna Kuchment covers science for The Dallas Morning News and for Scientific American, where she is a contributing editor. She previously worked as a senior editor at Scientific American and as a staff reporter, writer and editor at Newsweek magazine. She holds a Master of Science degree from the Columbia University Graduate School of Journalism.



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