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## 6 million U.S. residents are drinking uranium-contaminated water that could increase risk of liver damage



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Water from two aquifers in the US contains uranium levels that are significantly higher than the US Environmental Protection Agency's (EPA) maximum contaminant level (MCL).

What's more, these two aquifers provide drinking water to almost 6 million people, and almost 2 million of them live less than a mile from the contaminated groundwater, [according to a study led by two researchers from the University of Nebraska-Lincoln](#).

And according [to the EPA](#): "Intakes of uranium exceeding EPA standards can lead to increased cancer risk, liver damage, or both."

The researchers at the University of Nebraska-Lincoln analyzed almost 275,000 groundwater samples collected from about 62,000 locations from two aquifers that provide millions of people in the US with drinking water: the High Plains and Central Valley.

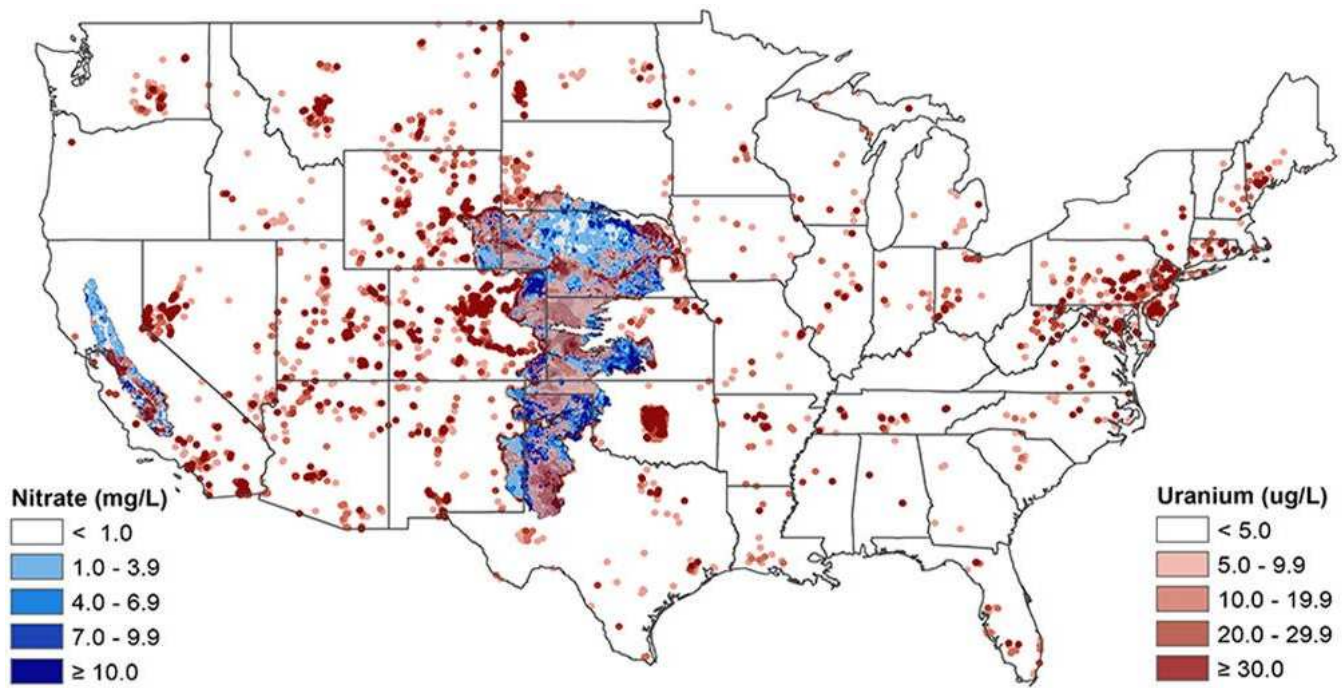
The High Plains aquifer is the largest in the US: It spans from Texas to South Dakota and stretches over a total of eight states. And it not only has uranium concentrations 89 times the EPA's maximum contaminant level (MCL), but it also has nitrate concentrations levels 189 times the MCL.

The California-based Central Valley aquifer has even higher concentration levels with uranium concentrations 180 times the MCL and nitrate concentration levels 34 times the MCL.

Though the researchers say it's difficult to know how much uranium residents are ingesting personally, they mapped out the most affected regions: northern Texas and throughout Nebraska.



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### Map showing nitrate and uranium levels in aquifers

Uranium toxicity is caused by eating or drinking substances containing uranium. It then enters the bloodstream through the gastrointestinal system and is filtered by the kidneys, where it can cause damage to the kidney cells. A [study for the Agency for Toxic Substances and Disease Registry](#) also found that other potential damage might occur in the reproductive system.

Nitrate has also been shown to have adverse health effects on humans, although it mostly affects people with pre-existing medical conditions. Nitrate affects the ability of red blood cells to carry oxygen, but in most people the levels rapidly go back to normal. Infants on the other hand need longer to stabilize the oxygen levels and might develop a condition called methemoglobinemia or "blue baby syndrome." Nevertheless [many studies now dispute the link between nitrate](#) and the blue baby syndrome.

It can also adversely affect people who do not have enough stomach acids and people who have a lack of the enzyme that is needed to convert red blood cells back to normal (an inherited condition). Moreover, it can increase the risk of miscarriages and certain birth defects.

The study found that 78% of the uranium-contaminated sites are linked to the presence of nitrate, a common groundwater contaminant, that stems from chemical and animal waste fertilizers. Nitrate, through a series of bacterial and chemical reactions, oxidizes uranium which then makes it soluble and capable of leaching into groundwater.

The two aquifers irrigate cropland that accounts for one-sixth of the annual revenue generated by US agriculture.

The researchers report their results in the August edition of the journal [Environmental Science and Technology Letters](#).

