



COAL PRODUCTION AND USE in the United States has plummeted in recent years, but the wastes left

behind after burning it — largely as a fuel for generating electricity at power plants — keep on coming, and they have been stored in lightly regulated, water-filled basins since at least the 1950s. Environmentalists have long raised concerns over this sort of storage, and a recent study out of Duke University’s Nicholas School of the Environment, which found evidence of contamination in local water near 21 of these so-called coal ash ponds across five southern states, would seem to add new credibility to those concerns.

The Duke team took surface water samples from several sites in Georgia, Kentucky, and Virginia, and both groundwater and surface water samples in Tennessee. Alongside those they examined water sample data that had been previously collected by the North Carolina Department of Environmental Quality at 14 sites in that state.

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Jennie Harkness, lead author on the study, published last month in the journal Environmental Science & Technology, said the Duke team ultimately determined that all 21 sites showed signs that coal ash storage facilities were leaking into the water table. This included some storage basins that are no longer in use but still hold coal ash.

Harkness could not confirm that the chemicals from any of these ash basins actually pollute local drinking water supplies, but the data are worrisome, she suggested. At one disposal site near a retired coal plant in Wayne County, southeast of Raleigh, North Carolina, for example, the data revealed levels of arsenic in nearby groundwater that the researchers called “conspicuously high” — more than 66 times the maximum level of arsenic that the Environmental Protection Agency says should be allowed in drinking water. The highest levels of boron were also found at that site near the plant.

“We definitely see coal ash signatures in groundwater, and in some cases we saw high levels of arsenic specifically, which is a health concern for drinking water,” said Harkness. “But the question is whether or not that is actually getting into the aquifers that are being tapped for private or community wells.”

That question, Harkness said, would be an important focus of future research.

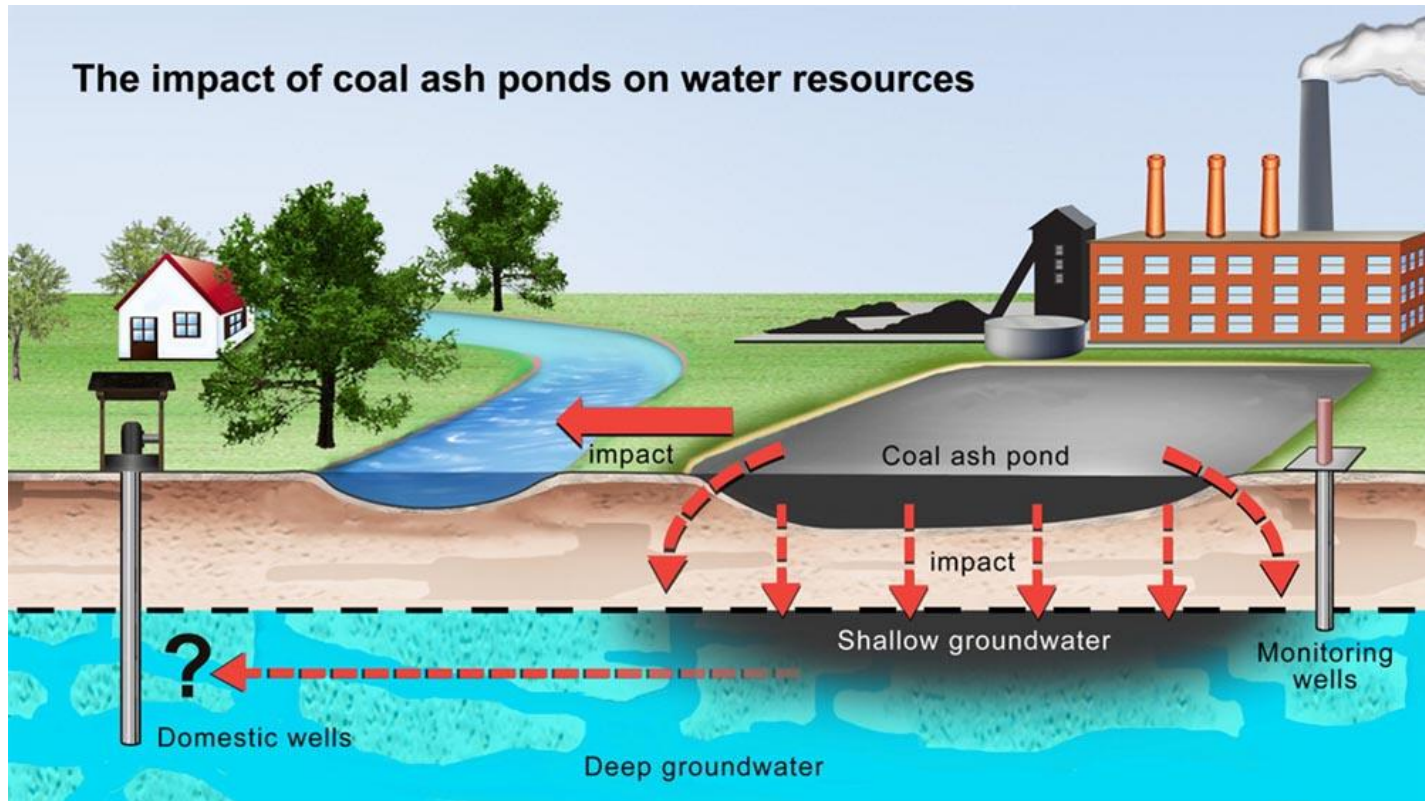
As it stands, coal ash — a general term for a number of ashy byproducts of coal combustion that can carry contaminants like lead, mercury and arsenic — continues to be one of the largest sources of industrial waste in the United States, with 130 million tons generated in 2014 alone. Some of that ash, according to the Environmental Protection Agency, can be beneficially reused as a component in concrete and other building materials, but the supply of coal ash far outstrips demand.

According to the American Coal Ash Association, less than half of the annual supply — roughly 62.5 million tons — is currently recycled. The rest is stored at over 1,000 facilities across the U.S., according to the EPA. About 30 percent of these are landfills. The rest are storage ponds — technically called surface impoundments.

John Ward, a spokesman with the American Coal Ash Association, said he expected demand for recyclable coal ash to increase over time. But even projecting current trends of reuse out to 2040, a large percentage of coal ash will still be headed for disposal. “We will still be making more ash than we use,” Ward said, “by a long shot.”

Environmental groups have pushed for years to have coal ash reclassified as hazardous waste, but the Environmental Protection Agency has so far declined. The agency did take steps in 2014 to federalize oversight of coal ash disposal — until then governed by a patchwork of differing state laws — by amending the

national Resource Conservation and Recovery Act with new guidelines for construction and use of coal ash disposal facilities nationwide. The toughest rules — which include new siting, monitoring, construction, closure and recordkeeping guidelines — apply to both new and existing surface impoundments.



- A Duke University team examined how and whether coal ash contaminants from impoundment ponds can migrate into surrounding water sources.
- *Visual by Duke University/J. of Environmental Science and Technology*

In large part, that's because most such ponds were constructed without liners, and only a layer of clay prevents contaminants in the waste from potentially escaping into the groundwater — and eventually into local rivers and lakes. Many surface impoundments are scheduled to be closed in favor of improved storage methods, but the new Duke University study suggests that existing ash ponds could still prove problematic — particularly for communities that live nearby.

In North Carolina, concern over coal ash ponds is particularly acute.

All 14 of the sites analyzed by the Duke University team are owned by the electricity and gas giant, Duke Energy. According to the data provided from 156 wells near these 14 sites, 30 percent showed levels of selenium, arsenic, and aluminum — among other elements — that exceeded EPA drinking water standards. Four sites also exceeded the [North Carolina DEQ's](#) groundwater standards for selenium, and eight exceed the state standards for arsenic.

Zenica Chatman, a spokeswoman for Duke Energy, forwarded a statement prepared by the company in response to the Duke University analysis. "This study doesn't appear to offer anything new," the statement declared, adding that Duke Energy continuously monitors the lakes, rivers and groundwater near its plants to ensure that they remain protected. In accordance with updated EPA rules and North Carolina's own [Coal Ash Management Act](#) — passed in 2014 after a leak at one of Duke Energy's sites released 39,000 tons of coal ash into the Dan River in Eden, North Carolina — the company said it is also working towards eventual closure of all of its coal ash ponds.

That's an improvement, local environmental advocates suggest, but it doesn't go far enough. Just last month, the Southern Environmental Law Center — a conservation advocacy group that funded the Duke University

Study — brought a federal [lawsuit](#) against the energy company on behalf of the a local citizen group. It accuses Duke Energy of allowing ash-basin toxins to flow out of the more than 6 million tons of ash stored at its Mayo Plant in Roxboro, North Carolina.

The Mayo facility is one of the 14 sites where data was examined by the Duke University team. The researchers found that in the groundwater data for that site, the levels of selenium exceeded the EPA's drinking water standards. In the group's notice of intent to sue, which was sent to Duke Energy in April, the organization also suggested that the energy giant's ash ponds were contaminating regional surface water sources with "various coal ash pollutants" like arsenic, chromium and vanadium.

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SELC Senior Attorney Frank Holleman says that the goal of the lawsuit is to get the company to excavate the ash basin and put the waste into a lined landfill — which it already has on site. According to the most recent records from Duke Energy, 6.6 million tons of coal ash are stored in the ash basin, while 0.3 million tons are in the landfill.

"If you store millions of tons of waste containing arsenic, lead and mercury, in an unlined pit filled with water, in the water table next to drinking water reservoirs and rivers, held back only by dikes that leak, you are going to pollute groundwater and rivers," Holleman said. "They will leak — of course. It is as simple as that, they are primitive holes in the ground — by definition they leak."

IN ORDER TO MEET current environmental standards, state regulators said last May that Duke Energy

would need to excavate eight "high priority" sites by 2019, and 25 intermediate sites — including Mayo — by 2025. At the same time, the regulators asked the state legislature to allow reconsideration of those classifications in 18 months. In that time, Duke Energy will make repairs to some of its dams, and it has submitted a feasibility study on providing "permanent alternative water to nearby residents."

Holleman said that it was this 18-month delay by the state that led his organization to file a federal lawsuit, believing that the state and Duke Energy were working together against the sort of coal ash storage improvements that are already well underway in other places around the country. In South Carolina, for example, all three utilities there have agreed to excavate all unlined coal ash pits along waterfronts — about 20 million tons of ash in all, according to [cleanenergy.org](#). But North Carolina's sole utility, Duke, has been ordered by state courts to excavate just half of its sites.

In an email responding to the criticisms of the SELC, Mike Rusher, communications director for environmental protection at the North Carolina DEQ, defended the state's governor, Pat McCrory, and the agency's regulations over coal ash. "The McCrory administration has consistently proven it is committed to holding Duke Energy accountable to protect North Carolina's environment," he said. "Thanks to the Governor's leadership, all Duke Energy coal ash ponds in North Carolina are required to be safely closed in a way that protects the environment and public health."

The current closure plan for the Mayo site is to cap it in place, which the company says is both environmentally safe and cost effective. The SELC lawsuit argues that this it isn't enough, and it accuses Duke Energy of being in violation of the Clean Water Act. (After the Dan River incident, the company pleaded [guilty](#) to nine criminal violations of the Clean Water Act, and agreed to pay \$102 million for fines and restitution.) In an email response to the most recent lawsuit, Duke Energy said that the "SELC wants to burden North Carolina with the most extreme, most expensive and most disruptive closure option, without measurable environmental impact."

The SELC's Holleman disagreed. "This is a terrible legal, environmental and financial risk for them to take a half-measure and leave ash sitting in 50-80 feet of groundwater," he said. "That will not be tolerated long-term, and they should know that."