



POTOMAC RIVERKEEPER NETWORK

Actions to Safeguard the Potomac River from the Massive AI Data Center Surge

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The greater Washington D.C. metropolitan area is undergoing a rapid and profound land-use, energy and environmental transformation due to the development of hundreds of AI-driven, industrial-scale data centers. This comes with related infrastructure such as high-voltage power lines, electrical substations and roadways. The Potomac Basin has, by far, the largest



Data centers are industrial facilities in every way

concentration of data centers in the world. The region currently has over 350 data centers and is on track to have some 1,200 of them totaling 200 million square feet of buildings on an estimated 20,000 acres of land.

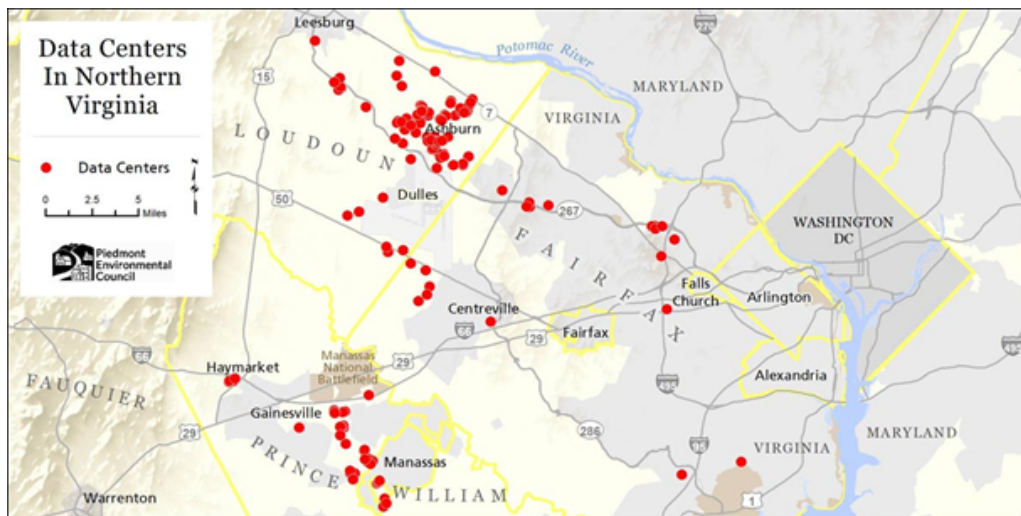
A Growing Potomac River Threat: Requiring Action Now

The Potomac River is one of America's most ecologically and culturally important rivers. It supports wide swaths of American history and prehistory and is itself an ecological wonder. It is a major tributary of the Chesapeake Bay, a globally important resource. An unprecedented data center surge is rapidly unfolding within the Basin. This surge's physical presence is being examined by local officials on a site-by-site basis but its broader ecological and water quality impacts are only beginning to be discussed in public forums. These impacts will become much more evident in the next five to eight years as more approved data centers are built and become operational. Each of these facilities will consume millions of gallons of water. This will be sourced from a combination of overtaxed groundwater supplies and water utilities. While many data centers use air cooling in combination with water cooling, some solely water-cooled buildings will require up to a million gallons per day. There are also many water quality impacts that are largely being overlooked. These include increased rates of polluted run-off from thousands of acres of clearing and paving, possible

fires and toxic release from electrical hundreds of electrical substations, the amassing of tens of millions of gallons of toxic diesel fuel in the watershed, the use of cleaning, cooling, biocide and anti-corrosive chemicals at each location, the use of PFAS-laden material, such as wiring, and an unprecedented accumulation of toxic metals from the servers/processors themselves. Millions of these servers will end up in landfills and likewise will pose a threat to Potomac Basin groundwater and drinking water supplies. In addition to the direct impacts from the building sites and electrical substations, the data centers will require more long-distance power transmission lines that will be developed across hundreds of miles of ecologically important Potomac watershed lands. These will cause ecological and habitat disruptions and their own potential water pollution.

These potential water usage and pollution threats will intensify as these data facilities age and their fuel storage systems, and their piping and fluid circulation systems start to deteriorate.

The Potomac River needs safeguards now to protect it, and the people who rely on it, from harm. Local, state and federal officials have an opportunity to take actions to prepare for what is developing.



Just 350 of a planned 1,200 data centers have been constructed as of early 2026

A note on nondisclosure agreements

The data center industry makes use of sophisticated technology, and each company considers its technology proprietary. As a result, applicants for local land use approvals often insist on non-disclosure agreements with local governments. This shrouds the individual developments in secrecy, This makes true environmental assessment quite difficult. Many of safeguards recommended in this report call for increased daylighting of overall data center impacts and more cumulative perspectives regarding Potomac River water quantity and quality.

Critical Actions for Safeguarding the Potomac

Require full assessments, public disclosure, and low-usage designs regarding water withdrawals

Many of the Potomac Basin's industrial-scale data centers will need large amounts of water for cooling. The amount of heat produced by tens of thousands of the servers and processors in each building must be counteracted to keep the equipment cool and therefore functional. Water-cooled hyper-scale data centers can consume up to one million gallons or more per day. Closed system and air-cooled data centers also use large amounts of water. The data industry rarely discloses its water usage, and the cumulative impact of the Potomac Basin is unknown but is likely to be major.

Solution: Require developer water usage assessment and disclosure statements. There must also be an appropriate selection of designs to mitigate or eliminate adverse impacts on groundwater and local water supplies. State, regional and local agencies must assess and monitor cumulative impact and disclose those impacts to the public.

Enforce tighter rules for cooling system discharges:

Data centers add chemicals to the water used for their cooling systems whether they are entirely water-cooled or are part of a combined air- and water-cooling system. The water is mixed with coolants, biocides and anticorrosion chemicals and then used for a period. Heavy metals can also leach into the cooling water stream. This water is periodically flushed under a state permitting system into local waters. Again, the permits are reviewed on a site-by-site basis, and cumulative impacts are not being disclosed or addressed.

Solutions: Develop overall assessments of tributary-wide discharge impacts and require on-site monitoring and testing of cooling system effluent. Require on-site water treatment prior to any toxic releases.

Require safer diesel fuel storage tanks, piping and guarantee regular inspections

The region will likely have more than 25,000 diesel backup generators which will require tens of millions of gallons to be stored on site. Each generator will burn more than 100 to 180 gallons per hour and if, for example, 50 percent of them fire up at one time, such as during a summer heat wave, when the regional electric grid becomes overtaxed, they would need one million to two million gallons of fuel per hour of operation. This means numerous large-scale storage tanks, miles of piping and many thousands of valves and fittings that can deteriorate and leak.

Solutions: Install double-tanking fuel storage systems and other diesel piping and infrastructure safety measures. Enforce rigorous site inspection schedules and refueling protocols to prevent diesel fuel from escaping into local ground and surface water.

Position sophisticated pollution monitoring stations on key Potomac tributaries upstream from public drinking water intakes:

These would surely include the Goose Creek and Broad Run in Loudoun County, the Bull Run, Broad Run and the Occoquan in Prince William County, the Accokeek and Potomac Creeks in Stafford County, the Monocacy River and Tuscarora Creek Frederick County, Maryland and other key tributaries where data centers are or will be located and would flow into the Potomac mainstem. The greatest concentrations of existing and approved data centers are upstream of regional drinking water intakes. There would also be potential adverse impacts to tributaries that provide water to ecologically important areas such as national wildlife refuges and wetland reserves.

Solution: Install sophisticated and continuous water quality monitoring stations to check for PFAS, cleaning and cooling chemicals, diesel leaks, pavement treatments, toxic metals and other contaminants. Also monitor for increased sediment loads and salts. Make this information available to the public.

Develop and implement an at-scale plan for e-waste disposal:

Tens of millions of processors, servers, and battery systems and thousands of miles of PFAS-treated wiring and other e-waste material will become obsolete and will be removed from regional data centers each year. This could be as much as 10 to 15 million computers annually or even more. A small percentage will undergo recycling, but the scale of this disposal need will be so large that the bulk of this material will end up in landfills, many of which have leak problems. These units and wiring contain mercury, cadmium, lead, arsenic, lithium, PFAS and other toxic substances that can escape into groundwater and streams. The landfill system within the Potomac Basin is not adequately equipped to handle the massive scale or the toxicity of this disposal challenge.

Solution: State and local agencies must require data center developers and owners to make sure that hazardous material recycling is maximized. The region also needs a coordinated disposal plan including the establishment of new data center specific landfills designed to safely contain this toxic material in perpetuity. To fail to handle this ahead of time will cost the public \$billion in remediation, endanger public health, and eventually pollute the Potomac with highly toxic material.

Increase water monitoring downstream of legacy Superfund and brownfield sites being developed for data centers:

In Maryland, a major development in Frederick County, MD is planned on the former Eastalco aluminum manufacturing plant site. This site was designated a Superfund site and has undergone remediation but still contains ponds and soils holding cyanide, fluorides and corrosives that, through land clearing and moving, can be released and flow into Tuscarora Creek upstream of Potomac drinking water intakes. The former Atlantic Research rocket fuel production site in Prince William County, VA, is also a remediated Superfund site and contains ponds and soils with dangerous chemical compounds. This site is being developed with 10 million square feet of data centers. An assessment of data center development on former toxic waste sites, including former power generating facilities with legacy coal ash contamination, in the watershed is necessary.

Solution: Rigorous regulatory review and permitting of data centers on contaminated sites to ensure existing environmental liabilities are adequately controlled; State-installed sophisticated monitoring stations immediately downstream of these sites to provide advanced notice of toxic material pollution.

Require updated modeling and structures for flood retention:

Data centers are city block-sized buildings on large sites that need to be cleared and leveled due to their building sizes and for security reasons. They also require parking facilities and roads. Data center developers and local governments are currently using outdated rainfall prediction models to design flood control structures. This results in flood-retention facilities that are inadequate to handle today's more torrential rainfall. The prediction models need to be updated so that increased sediments, salts, road chemicals and more from reaching surface and groundwater in the Potomac Basin. This will also help to prevent stream scouring and loss of riparian habitat.

Solutions: Update the modeling and design larger onsite retention basins. Have more structures to slow run off velocity and have more uniform required use of water-pervious surfaces to support groundwater recharge.

Conduct a comprehensive Potomac watershed impact assessment:

Legislators at the state and local level could temporarily pause action on data center approvals and permits until comprehensive assessments of the cumulative impact of data centers and related infrastructure can be initiated. This assessment needs a tight timeline and should consider effects on water pollution, water withdrawals, solid waste, legacy contamination sites and ecological and natural resource impacts. Impacts of long-distance high-voltage power transmission line development should be included in this assessment. In addition, there should be specific focus on

impacts on drinking supplies and added costs that would become necessary for improved safe drinking water treatment. Elements of this assessment should include:

Improved mapping of and stricter rules for priority source-water areas: Some areas within the Potomac Basin have been identified as priority watershed areas by the Interstate Commission for the Potomac River Basin (ICPRB), the U.S. EPA and others for protecting water supply sources as prescribed in the Safe Drinking Water Act. These source-water areas need greater scrutiny and protection regarding data center development.

Identify and protect areas of national and state interest: Added consideration is needed to prevent the siting of data centers near such areas as national and state parks, forests, national and regional wildlife refuges, ecological reserves and other such resources. These provide significant water quality, quantity and fisheries benefits and must be protected for the long-term ecological health of the Potomac.

Advanced power line mitigation is necessary for the integrity of the Potomac watershed: The fact that long distance power lines are planned in the upper Potomac watershed in Maryland, Virginia and West Virginia will have an impact on the wildlife, fisheries and ecology of the Potomac basin. Recent research shows that high-voltage power lines are disruptive to ecological function and can degrade major watershed ecosystems.

The 14,000 square mile Potomac watershed has had many pollution threats over the years, most recently including the largest single sewage spill in U.S. history. The scale of industrialization resulting from the AI data center surge is massive and poses an immediate and growing threat.

Data centers are often debated in public forums as problems for local communities regarding loud noise and how they impose on nearby residential neighborhoods with huge and inappropriate structures. Or their energy usage and effects on higher consumer energy prices is called out as costly and unfair. But the AI data center surge also has immense regional environmental implications and many of these are threats to the value of the Potomac River and the residents of the watershed.

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Potomac Riverkeeper Network is a registered 501(c)(3) non-profit organization with three regional Waterkeeper branches: Potomac Riverkeeper, Upper Potomac Riverkeeper, and Shenandoah Riverkeeper. PRKN's mission is to protect the right to clean water for all communities and all those who live in and rely upon the Potomac and Shenandoah watersheds by stopping pollution, making drinking water safe, protecting healthy river habitats, and enhancing use and enjoyment for all.