Opinion

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How AI clouds the future of WA's rivers

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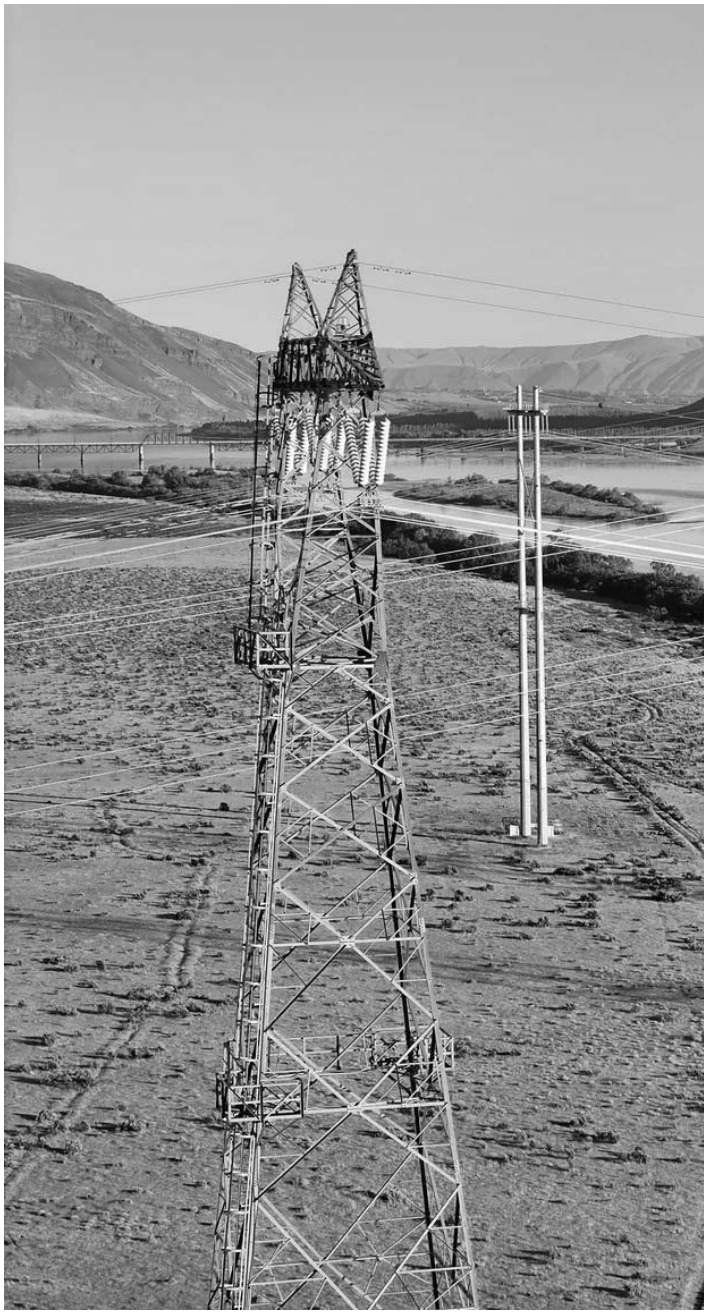

Ecological monitoring should be seen not as a barrier to innovation, but as a prerequisite for responsible AI infrastructure development, writes the author. Pictured are transmission towers along the Columbia River at... (Karen Ducey / The Seattle

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By Faisal Hossain

Special to The Seattle Times

Back in 2024, when our team of University of Washington scientists was introducing a satellite-based tool to track river temperature for improving fisheries management by tribal governments along the Columbia River, I was asked a question that stayed with me.

Elaine Harvey, watershed department manager for the Columbia River Inter-Tribal Fish Commission, asked whether satellites could be used to understand what might be happening near data centers in Washington. At first, I didn't immediately see the connection. We had all been reading about water shortages and rising water and energy costs linked to these resource-intensive facilities. But the idea that data centers might be warming rivers — especially in the age of artificial intelligence — had never crossed my mind.

I was familiar with the usual drivers of river temperature changes: reservoir operations, climate change, drought and irrigation. Yet Harvey, drawing from deep, lived connections to these rivers, pointed to anecdotal evidence suggesting that data centers might also be quietly contributing to river warming.

That insight led us to investigate further. We applied 40 years of satellite-derived river temperature data to 37 AI data centers for which we had location and operational timelines. This work built on an existing, validated tool — Thermal History of Regulated Rivers, or THORR — which had already been tested by CRITFC scientists.

What we found was difficult to dismiss as coincidence.

Our early analysis revealed localized river warming signals consistent with potential thermal impacts from nearby data centers. In particular, we observed that December

river temperatures in the Columbia River — when conditions are typically colder and less influenced by confounding summer factors like low flows and shallow depths — have been gradually increasing near clusters of AI data centers.

On average, we detected warming of up to 2.5°C following the establishment of these facilities. The signal intensified closer to the source and generally dissipated within about six kilometers downstream — unless another data center or cluster appeared. While these numbers come with uncertainty inherent in satellite measurement of river temperature, there seems to be a sufficiently observable trend to warrant more detailed investigation in the form of field measurements involving higher precision methods (such as drones to capture heat signature).

These findings suggest a reframing of how we think about the AI "cloud." The next time we consider AI data centers or even an AI-powered query — which can consume significantly more energy than a standard web search — we should also think about warming rivers and the ecological consequences that may follow.

In other words: The AI cloud can warm the river.

This issue is particularly relevant for Washington. Since the 1990s, data center development has expanded rapidly worldwide, a trend now accelerating with the rise of AI. Washington has become a major hub due to its strong technology sector, favorable tax policies and access to relatively low-cost hydroelectric power from the Columbia River Basin. Given the substantial water and energy demands of these facilities, understanding their environmental and ecological impacts is becoming increasingly urgent.

Our non-meteorological AI "cloud" is now an integral part of modern life. Yet one critical and often overlooked issue is water quality, particularly the localized warming of rivers. A major barrier to rigorous scientific assessment is the limited availability of facility-level data, including how cooling water is managed and whether warmed water is discharged back into rivers or diverted through municipal systems. Without such transparency, thermal impacts cannot be effectively evaluated or managed.

We therefore call on the scientific, policy and data center communities to take action through four key steps:

- River temperature, alongside other ecological indicators, should become a standard

monitoring requirement for data center infrastructure.

● Transparency in cooling-water withdrawals and discharge practices must be improved.

● Sustainable AI governance frameworks should extend beyond carbon accounting to include water and ecosystem impacts.

● Ecological monitoring should be seen not as a barrier to innovation, but as a prerequisite for responsible AI infrastructure development.

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Our goal is not to halt the growth of AI data centers in Washington, but to ensure that this infrastructure evolves in partnership with environmental safeguards and local communities. Making the thermal footprint visible is the first step toward reducing harm and supporting the long-term resilience of freshwater ecosystems.

Washington has long been a leader in integrating science into policy and planning. It is time to extend that leadership to address the warming effects of the non-meteorological cloud — now an essential part of our lives.

Editor's note: Recent graduates Shahzaib Khan and George Darkwah from the University of Washington and summer intern Olivia Wang from the University of California, Berkeley, contributed to this work.

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