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COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

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July 29, 2026

Filed via email: datacenter.ac@oregon.gov

Data Center Advisory Council
Oregon Department of Energy
550 Capitol St. NE
Salem, OR 97301

RE: Energy and Water Impacts and Recommendations for the Oregon Data Center Advisory Committee (ODCAC)

Dear Chair Hoffman, Chair Jung, & Members of the Advisory Committee:

The Columbia River Inter-Tribal Fish Commission (CRITFC) appreciates the opportunity to participate and present to this Committee. CRITFC is a tribal organization formed by its member tribes to provide technical, policy, and legal support to protect their treaty-reserved rights and resources, which are highly impacted by the expansion of data centers in Oregon and across the Columbia Basin.

Over the past year, CRITFC has developed expertise and directly engaged on these issues, including through the 2025 Washington Governor's Data Center Taskforce and subsequent legislative efforts, implementation of Oregon's Power Act through docket UM 2377, contributing to the Northwest Planning and Conservation Council's Ninth Power Plan, and through presentations to this Committee. Throughout this Oregon process we have appreciated the quality of information presented and the members' commitments to open discussion and comprehensive recommendations. We recommend that Oregon conclude this process with substantive, formal consultation with CRITFC's member tribes, whose rights and natural resources are affected by the rapid expansion of data centers in Oregon.

CRITFC was formed in 1977 by the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon. CRITFC provides scientific research, policy coordination, and enforcement services on behalf of the member tribes, in furtherance of the rights reserved and guaranteed to them by their Treaties of 1855, and to improve the condition of Columbia Basin fish, wildlife, and cultural resources. The following recommendations are made from CRITFC's policy expertise and are guided by *Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon Plan* and *2022 Tribal*

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Energy Vision for the Columbia Basin.[1] Together, we offer these recommendations as part of a broader policy foundation to protect the communities, clean water, and ecosystems of this region.

This letter supports our March and May presentations on water and energy impacts and includes policy briefs and recommendations to address these (Attachments A and B). In addition, we include background on the operations and constraints of the federal hydropower system with respect to fish protections and the inability of that system to provide additional flexibility to meet these large loads (Attachment C).

The Scale of Data Center Expansion Demands Comprehensive Policy Measures

CRITFC is concerned by the proliferation of data centers in the Columbia River basin, and the threat these developments pose to salmon, ecosystems, and tribal treaty rights. Oregon is home to one of the largest concentrations of data centers in the world, including multiple hyperscale facilities which can consume as much electricity as entire cities.[2] These developments strain electricity supply, land, water resources, and worsen pollution. For example, Hillsboro has become one of the fastest growing data center hubs in the country; between 2020 and 2025, data center electricity demand in Portland General Electric's (PGE) service territory grew by more than 600 percent.[3] In the arid high desert region of the Columbia Basin, Google, Meta, and Amazon operate massive campuses where energy and water use outpace local communities.[4]

The increasing energy demand of data centers poses significant uncertainties. Data center growth drives demand for more resources: from new energy generation facilities, to expanded transmission lines, distribution infrastructure, and backup generation (often using polluting fossil fuels). Rapid new resource demands increase the energy costs for communities (both from the socialization of costs and greater scarcity) and create new impacts for ecosystems, public lands, tribal resources, and the climate.

Water impacts are significant and tied to a facility's energy use, cooling systems, and size. Data centers can dominate municipal water use and discharge, putting strain on already

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[1] Columbia River Inter-Tribal Fish Commission, *Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon), The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes* (1995, updated 2014), https://plan.critfc.org/assets/wy-kan-update.pdf , and Columbia River Inter-Tribal Fish Commission, *Energy Vision for the Columbia Basin* (2022), https://critfc.org/energy-vision/

[2] Burnett et. al, PAE Engineers, *Energy & Water Use Impacts of Building System Design for Data Centers, Design Considerations for Oregon & Washington* at 3 (2025); https://critfc.org/documents/energy-water-use-impacts-of-building-system-design-for-data-centers/.

[3] Burnett at 3.

[4] Columbia Riverkeeper, *A Closer Look: Columbia River Data Centers* (Feb. 2026), Kelechukwu Iruoma, *The Oregonian exposes Google and Amazon's massive water use for data centers*, Reynolds Center (Nov. 20, 2023), Adam Seessel, *Fight Over Water Use at Huge Google Data Center Exposes Deeper Issues in The Dalles*, Fortune (June 6, 2023), Andrew Selsky & Manuel Valdes, *Big Tech Data Centers Spark Worry Over Scarce Western Water*, Associated Press (Oct. 25, 2021).

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drought-affected watersheds and threatening tribal water rights. Without better transparency and stronger regulation, these risks will grow.

The scale of data center developments in the region demands state leadership. The Northwest Power and Conservation Council (NPCC) has predicted that the Pacific Northwest may need an additional 2,200 to 4,800 new annual megawatts (MW) of energy capacity by just 2030 alone, equivalent to between two and four cities the size of Seattle.[5] If data center demands reach the higher end of forecasts, loss of load probability is expected to increase from 3% to 13%, threatening regional grid failure and loss of hydropower system protections for migrating salmon on the Columbia River.[6] The risks are compounded by climate change, which drives increasing extreme weather events and drought, creates additional strain on river ecosystems, hydropower, migrating salmon, and the grid. The record low snowfall this year in Oregon and across the West underscores the urgent need for action to protect communities and natural resources from the increasing burdens contributed by data center developments.

RECOMMENDATIONS

1. Transparency

Fundamentally, data centers must provide greater transparency for Oregon regulators and the region to understand the technology, the scale of development, and impact of data projects. This must include information on facility design, infrastructure and grid requirements, water use and discharge, backup power generation and emissions, and the local context of resources and community impacts. Currently, information is rarely available to the public, leaving both tribal and state resource managers estimating the resource demand of projects, threats to ecosystems, and the cumulative impacts for communities and the region.

2. Tribal consultation

The State must consult with tribal governments before approving new data center developments. Tribes are not stakeholders or voluntary organizations; they are sovereigns, with fundamental responsibilities to protect their citizens, rights, and resources. Treaty reserved rights to harvest these resources into perpetuity underpins a responsibility that cannot be abandoned. Oregon must consult with tribes as resource managers and fellow sovereigns responding to the new rapid expansion of this resource intensive industry.

3. Fully assign costs and offset impacts to others

Data centers must fully bear the costs associated with their energy, water, and land-use demands, ensuring these expenses are not shifted onto Oregon's communities or natural resources through tax exemptions or socialized utility rates. The Oregon Public Utility Commission's POWER Act (House Bill 3546) implementation provides a model for

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[5] Northwest Power and Conservation Council, *Ninth Plan Demand Forecast (staff presentation to Council),* Slide 31 (May 29, 2025), https://www.nwcouncil.org/fs/19380/2025_0429_2.pdf;

[6] Northwest Power and Conservation Council, 2029 Adequacy Assessment, pp. 27- 28 (August 2024), https://www.nwcouncil.org/fs/18853/2024-4.pdf

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statewide cost allocation, requiring data centers to pay for both new infrastructure and the impacts on existing resources. Similar cost recovery provisions must be applied to water use, guaranteeing that data centers finance infrastructure upgrades and compensate for their effects on other users and ecosystems.

Beyond paying for direct costs, data centers must offset the broader cumulative impacts of their operations. This includes contributing to community benefit funds and mitigation programs addressing increased energy prices, water scarcity, and environmental degradation exacerbated by climate change and extreme weather. The PUC's recent order establishes a precedent by requiring data centers to support community weatherization and efficiency initiatives. Extending similar requirements to water and land use mitigation will help ensure that affected tribes and communities are not left to shoulder the burdens created by large-scale data center development. These measures are urgent and necessary to protect Oregon's communities and natural resources amid accelerating industry growth.

Energy Recommendations

1. **Safeguard Treaty fisheries, statewide energy policy, and community health, before service to data centers.**

The rapid growth of large data center loads presents unique threats to power system reliability with downstream impacts for treaty fisheries. Utilities have an obligation to serve all customers in their service territories, but few options exist to delay service when reliability risks arise. Power outages threaten community health and businesses and jeopardize migrating salmon when the federal hydropower system is called upon to provide backup power during emergencies. The obligation to serve massive new loads also challenges utilities' efforts to procure sufficient renewable resources to meet statewide decarbonization mandates and renewable portfolio standards, driving up costs across the region. Currently, data centers can request service and shift risks on the utility, customers, migrating fish, and regional grid reliability. To keep the lights on, protect salmon, and ensure continued progress on the state's energy goals, Oregon should set a clear expectation that utilities do not serve large data centers if any of these standards are threatened. Oregon's Public Utility Commission took the right approach in the recent UM 2377 order, which required compliance with Oregon's climate laws before large data centers could be interconnected. This should be replicated statewide.

2. **Manage data center demand during peak times and curtail before energy emergencies.**

To keep the lights on in communities and protect endangered salmon runs, data centers must be required to manage their demands during peak times and emergencies. Data centers pose an enormous threat to the reliability of the power grid because of the sheer size of their demand and the pace of their development expectations. In times of energy shortages, federal dam operators may eliminate salmon migration protections at dams, resulting in increased mortality among migrating fish. By prioritizing load reductions at data centers during peak periods and before grid emergencies, we can provide significant

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benefits to the power system, reduce overall resource needs and costs, and protect the fisheries that are the lifeblood of the region.

Data centers can readily manage their power demands but must be required or incentivized to do so. An MIT study found that data centers can shift workloads across time, called "temporal flexibility", reducing grid costs and supporting renewable energy integration.[7] A Duke University study documents a real-world test at an Oracle data center showed 25% peak-hour power reduction using software-based load management.[8] To provide load flexibility, data centers will likely need information on the duration, frequency, and likelihood of interruptions. Utilities and BPA will need new arrangements to utilize this flexibility to protect consumers and migrating salmon. CRITFC is committed to working with other entities to find solutions to reduce data center loads during power emergencies to protect migrating salmon and steelhead.

3. Update electric energy contingency plans.

The Emergency Protocols for the Columbia River Power System include requirements for BPA to take pre-emptive actions to try to secure additional power or reduce loads in anticipation of an energy emergency before it reduces or eliminates spill and reservoir operations for migrating salmon and steelhead.[9] The Technical Management Team and BPA need a mechanism to use data center interruptibility and utility emergency measures in support of the grid and to include such in the Pre-emptive Actions identified in Attachment 1of the Emergency Protocols. Oregon should together with Washington, Idaho, and BPA should explore what mechanisms may be needed to align BPA's fish operations and emergency preparedness with data center curtailment, flexibility, and associated demand management opportunities.

Oregon updated its Energy Security Plan in 2025; Washington's State Curtailment Plan for Electric Energy was updated in 1999.[10] These plans include detailed information on identifying and responding to energy emergencies to protect public health and safety including potential curtailment of load to various customers before emergencies. These plans should be updated to incorporate actions to interrupt data center loads during electric energy emergencies.

4. Contribute to resilient energy and storage resources for the future grid.

Data centers should contribute to a resilient, fish-friendly energy system. CRITFC's Energy Vision for the Columbia River Basin sets a roadmap for how renewable resources in combination with increased storage, peak demand reduction, and increased energy

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[7] https://ceepr.mit.edu/publications/.

[8] https://www.aceee.org/white-paper/2025/10/opportunities-use-energy-efficiency-and-demand-flexibility-reduce-data-center.

[9] Emergency Protocols, Columbia River System, updated December 5, 2025. https://public.crohms.org/tmt/documents/wmp/2026/Appendix/Appendix_1_Emergency_Protocols_20251202.pdf

[10] 2025 Oregon Energy Security Plan. https://www.oregon.gov/energy/safety-resiliency/pages/energy-security-plan.aspx, Washington State Curtailment Plan for Electric Energy, Chapter 194-22 WAC. https://app.leg.wa.gov/wac/default.aspx?cite=194-22.

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efficiency can provide clean, reliable, and affordable electricity while supporting the restoration of heathy, harvestable salmon populations. Oregon works alongside tribal fish managers and shares many of these goals, as reflected in the Columbia Basin Restoration Initiative with Washington and CRITFC's member tribes, as well as in the policies of its own the Oregon State Energy Strategy.[11]

Data centers should be able to build their own resources so long as they contribute to the overall goals of the region. This must include co-locating resources that deliver renewable energy and storage, such as rooftop solar and backup battery systems. Data centers should not continue to use diesel and gas backup generators, when these power systems are known to threaten community health and Oregon's climate goals.[12] Alternative technologies are readily available, and should require data centers to contribute to the future grid Oregon communities and tribal fisheries need.

5. Improve data center efficiency and reduce overall energy demand.
Data centers should be required to use the most energy efficient processing and cooling technologies commercially available at the time of construction to reduce their energy load and impact on the grid. If efficient cooling is not feasible because of water demands, the data center should mitigate energy and peak load impacts using renewable energy, storage, and power curtailment measures discussed above.

Water Recommendations

1. Transparency, Regulation, and Comprehensive monitoring
A facility's water footprint is shaped by factors such as its purpose, design, location, and power and water sources. Data centers must be transparent about their water use, water discharge plans, and chemical usage, publicly reporting water-related impacts to state and local regulatory bodies so that agencies, local governments, impacted communities, and tribal sovereigns can evaluate risks and necessary mitigation measures. Oregon should require mandatory, comprehensive monitoring of water quality, including thermal effects and chemical contamination, with daily reporting of intake, consumption, and effluent volumes to ensure accountability. Data centers should adopt the best available technologies to minimize net water impacts and protect aquatic ecosystems. Any connections to municipal water or wastewater systems must be preceded by an assessment of system capacity and proof that upgrades will not lead to untreated discharges into waterways. The state should establish siting restrictions to prevent water-intensive development in critical fish habitats protecting salmon and other cold-water species.

2. No Net Impact
Approval of data centers should require demonstration of no net impact on watershed flows, temperatures, pollution levels, and treaty-protected fishery resources. Water rights

[11] https://critfc.org/cbri/ , https://www.oregon.gov/energy/data-and-reports/pages/energy-strategy.aspx
[12] https://www.opb.org/article/2026/07/22/data-center-eastern-oregon-air-quality-umatilla-basin/

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and allocations should not be granted unless enforceable fish protection measures are guaranteed, and allocation criteria must prioritize treaty-protected resources. Additionally, regulatory frameworks should be sector-specific, with robust monitoring programs and cumulative impact assessments that account for existing over-allocation, climate change projections, and the cumulative effect of all water uses on ecosystem health.

Before siting decisions, the state should conduct thorough economic and environmental analyses assessing potential transfer and impairment of existing water rights and avoid diverting municipal water for non-municipal purposes. No water resources should be allocated to data centers unless it can be demonstrated that such use would not affect treaty resources, local municipal water security, or watershed health, including stream flows for anadromous species, temperature, and pollution. By synthesizing the detailed requirements from the first version with the broader regulatory and cumulative impact considerations from the second, this version addresses both reviewers' concerns and provides a clear, actionable framework.

Conclusion

CRITFC appreciates the opportunity to participate in this constructive state dialogue. We look forward to further discussions and will continue to develop technical expertise and policy recommendations to support regional solutions. Thank you for your time and consideration. If you have any questions, please contact our lead on this issue, Elijah Cetas, at (503) 238-0667.

Sincerely,

DocuSigned by:
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Aja. K. DeCoteau
Executive Director

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Data Center Energy Impacts

Rapid Demand Growth, Reliability Risks, and Salmon Protections

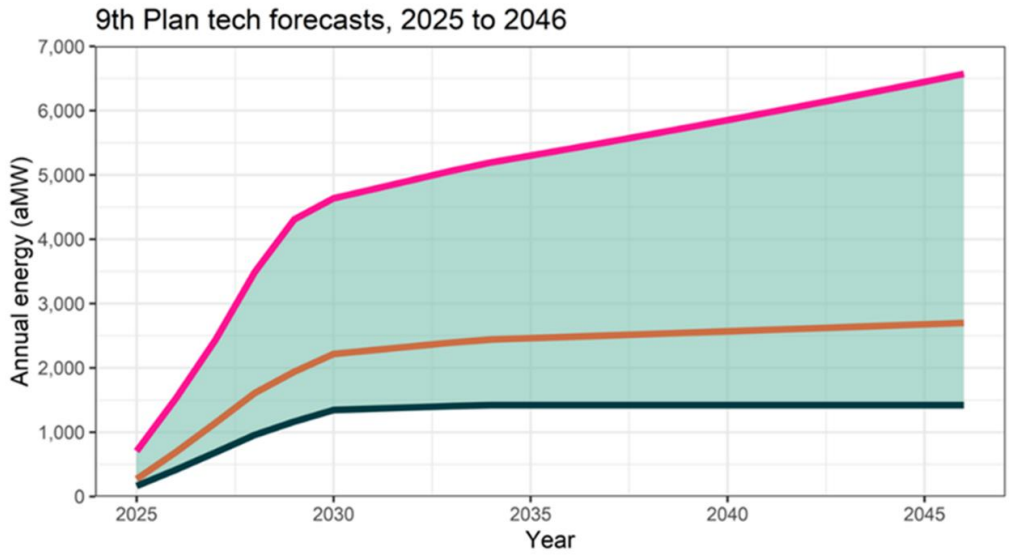
Policy Paper & Recommendations

Columbia River Inter-Tribal Fish Commission

The unprecedented growth of new data centers increases the risks of power blackouts and other energy emergencies in the Pacific Northwest. During energy emergencies, the federal government can reduce or eliminate fish protections at federal dams and increase mortality for migrating salmon and steelhead. This paper was prepared by staff at the Columbia River Inter-Tribal Fish Commission (CRITFC) for the Oregon Data Center Advisory Committee. It describes the impacts of data center load growth, especially on peak loads; the effects on reliability; the energy alternatives to address these issues, and recommendations on actions the region can take to address these problems.

Data Center Energy Use

Data centers consume unprecedented amounts of electricity. The Northwest Power and Conservation Council's draft 2026 Power Plan electricity forecast for data centers and chip fabrication shows a high case of more than 4,000 annual average megawatts ("average MW") and a medium case of over 2,000 average MW by 2030 across the region. For comparison, Seattle uses about 1,000 average MW.[1]



[1] Northwest Power and Conservation Council, *Draft Ninth Northwest Regional Power Plan: Load Forecasting & Data Centers Demand Overview* (2025), www.nwcouncil.org .

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The continued expansion of data centers in Oregon poses social, economic, and environmental risks in the form of electricity demands, land use changes, pressures on water supply and water quality, and pollution. Oregon is home to one of the largest concentrations of data centers in the world, including multiple so-called hyperscale facilities which can consume as much electricity as entire cities.[2] Hillsboro, for example, has become one of the fastest growing data center hubs in the country; between 2020 and 2025, data center electricity demand in Portland General Electric's (PGE) service territory grew by more than 600 percent.[3] In the arid high desert region of the Columbia Basin, Google, Meta, and Amazon have developed some of their largest data center campuses, where water and electricity use dwarfs that of the surrounding communities.[4] Data Center load appears suddenly, rather than on a ramp, causing significant disruption to the grid.

Data centers add significantly to peak loads. Peak times occur when the grid experiences the highest demands, and peaks loads are those that contribute to peak times, such as the collective use of air conditioning during a summer heat wave. Peak loads increase costs and the need for new generation resources to meet much larger demand at these discrete times. Large energy demands drive up costs and create new impacts on ecosystems and tribal resources.

Data centers can contribute significantly to existing peak loads. A study CRITFC commissioned with PAE Engineers found that data centers with air-cooled systems can have a peak load that is 50 percent higher than the base load.[5] If all the data centers use air-cooled systems, the peak load impacts could be 6,000 megawatts in the high case – meaning 6,000 MW higher contribution to an already strained grid. The figure below shows the changes in cooling loads throughout the day for air cooling and evaporative cooling; the purple line is the base load of the computer servers.

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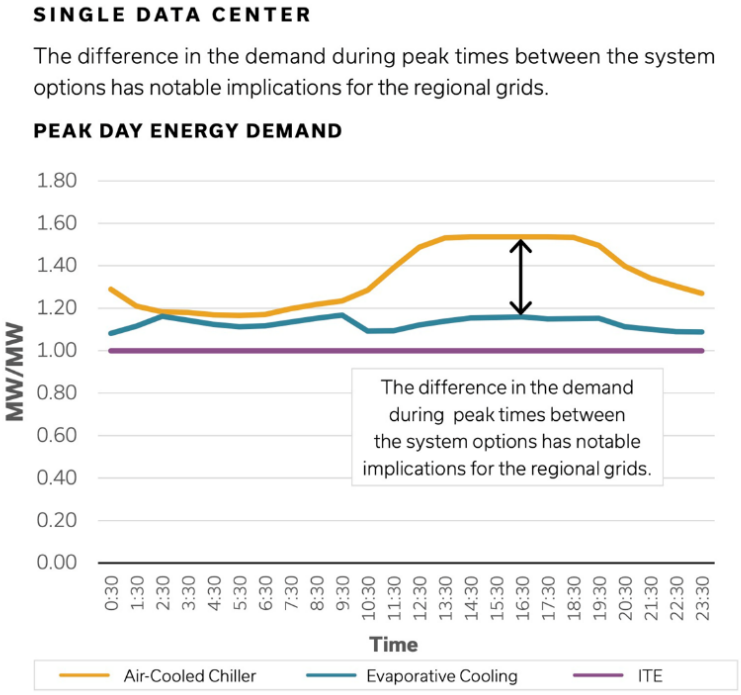
[2] Burnett et. al, PAE Engineers, *Energy & Water Use Impacts of Building System Design for Data Centers, Design Considerations for Oregon & Washington* at 3 (2025); https://critfc.org/documents/energy-water-use-impacts-of-building-system-design-for-data-centers/.

[3] Burnett at 3.

[4] *See, e.g.,* Columbia Riverkeeper, *A Closer Look: Columbia River Data Centers* (Feb. 2026), Kelechukwu Iruoma, *The Oregonian exposes Google and Amazon's massive water use for data centers*, Reynolds Center (Nov. 20, 2023), Adam Seessel, *Fight Over Water Use at Huge Google Data Center Exposes Deeper Issues in The Dalles*, Fortune (June 6, 2023), Andrew Selsky & Manuel Valdes, *Big Tech Data Centers Spark Worry Over Scarce Western Water*, Associated Press (Oct. 25, 2021).

[5] The Energy & Water Use Impacts of Building System Design for Data Centers, (February 2025), PAE, https://critfc.org/documents/energy-water-use-impacts-of-building-system-design-for-data-centers/

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Energy Reliability

Data center load growth threatens electricity reliability. The Northwest Power and Conservation Council's *Pacific Northwest Power Supply Adequacy Assessment for 2029* found that the reference case loss of load probability (LOLP) was 2.2 percent per year. The high data center scenario increases the LOLP to 13.3 percent per year.[6] BPA's recent federal court declaration reported a LOLP of 18%, assuming river operations that were similar. The declaration did not specify the assumptions on data centers.[7]

A recent study by Energy & Environmental Economics (E3) and sponsored by most of the electric utilities in the Pacific Northwest projected a 9,000-megawatt shortfall to meet peak loads. The study assumes about 3,000 new resources by 2030, leaving a shortfall of 6,000 megawatts. It also projects the potential for multi-day supply shortages.[8]

Power Emergency and Fish Protection. Loss of reliability can generate a power emergency. During power emergencies, salmon protections, which include passing the migrating juvenile fish over the dams via spillways, are reduced or eliminated in

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[6] Northwest Power and Conservation Council's *Pacific Northwest Power Supply Adequacy Assessment for 2029* (Aug. 9, 2024) at 27, https://www.nwcouncil.org/reports/2024-4/.
[7] Declaration of Rachel Dibble in Support of Federal Defendants' Opposition to Plaintiffs' Motions for a Preliminary Injunction, National Wildlife Federation and State of Oregon v. National Marine Fisheries Service and Public Power Council, page 19
[8] *Resource* Adequacy and the Energy Transition in the Pacific Northwest, Final Report, April 2026, https://www.ethree.com/?s=2025+adequacy

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accordance with emergency protocols. When spill is reduced, more salmon must go through the turbines or the bypass system, together known as powerhouse encounters, where survival is much lower than via spillway. The emergency protocols also include the removal of restrictions on reservoir ramping rates and fish-related reservoir draft limits, increasing minimum generation rates and shutting off sluiceways. All these actions reduce the number of salmon that survive through the hydropower system and increase delayed mortality. Additional background and detail on hydro operations for fish protections and the impacts of power emergencies is provided in Attachment C, Columbia River System Operations for Fish.

Passage through the turbines is hazardous for fish. Pressure changes can explode the swim bladder, and injuries occur from turbine blade strike or encounters with other structures, shear injuries can kill fish or cause disorientation which make the fish more susceptible to predators below each dam. And for fish that survive the turbines or bypass systems, cumulative stress from the experience can lead to lower lifecycle survival rates relative to fish that avoid powerhouse passage via spillways.

Survival varies by dam and species, with direct survival for fish that go through a turbine ranging from 65-90%.[9] Bypass passage survival varies between 85-95%. In comparison, survival via spillways is 92-100% survival with conventional spill passage and 96-100% survival with surface spill passage. Thus, when spill is curtailed and fish are forced through the powerhouse (turbine or bypass), up to 35% of the fish are killed at each dam during spill curtailment. And these numbers do not include the increase in delayed mortality noted above.

The compounding effects of the decreased survival rates are devastating for fish that pass eight or nine dams. For example, when an energy emergency in 2001 curtailed fish protections at all the federal dams over an extended period, millions of migrating salmon and steelhead were killed. Only 6% of juvenile steelhead survived their in-river migration from Lower Granite Dam on the Snake River down to Bonneville Dam in the lower river; in most years the survival rate is 40% to 70%.

Energy emergencies can last for hours or up to days and weeks. While there has not been a long-term energy emergency since the 2001 example above, the regional power system has had several close calls during recent years, and rapid data center growth increases these risks. Minor fish operations variances occur to accommodate short-term problems, and these will also likely increase with additional data center load pressure. The federal dam operators reduced fish spill operations for 4,269 hours between 2020 and 2025 for various reliability problems, including human and program error, maintenance, navigation, and debris issues, and transmission reliability reasons. Each of these variances represent

[9] PNNL, Passage and survival of juvenile salmonid smolts through dams in the Columbia and Snake Rivers, 2010-2018; https://www.pnnl.gov/publications/passage-and-survival-juvenile-salmonid-smolts-through-dams-columbia-and-snake-rivers

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another transgression against fish survival, further eroding survival through the hydropower system. Transmission reliability can relate to the need to adjust electricity generation to maintain voltage stability or reactive power on regional transmission lines or transmission lines to California.

Data center curtailment and flexibility can significantly lessen energy impacts. A Sylvan Energy Analytics study reviewed the E3 Phase 1 report and explored potential contributions to near-term solutions to address this problem and found that "Large load flexibility could mitigate most or all near-term winter resource adequacy needs under most load scenarios"; and "In the near term, the ability to curtail large loads first during emergency events can protect other customers from the most catastrophic health and safety consequences of supply shortages."[10] Flexibility and curtailment are essential measures to protect resource adequacy and the Columbia River fisheries.

Energy Efficiency and Resource Development

Background. Adding 2,000 to 4,000 megawatts of new electric energy resources and the transmission to deliver the power to data centers in the next four or five years would be unprecedented, poses challenges to meeting state clean energy goals, and would adversely affect tribal resources. CRITFC's 2022 Energy Vision for the Columbia River Basin (2022 Energy Vision) identified energy efficiency and conservation as the most fish-friendly resource to address the region's growing energy needs; these resources support clean energy goals as well.[11] Clean energy resources are second in line. With the addition of data center demand, the need for conservation, energy efficiency, and clean energy resources are even more important.

The 2022 Energy Vision included several specific energy resources recommendations to develop adequate resources and ensure reliability of the power system. The energy resource recommendations were based on an analysis of alternative energy costs using data from the Lazard investment bank. Lazard publishes a yearly summary of generation costs. Their summary uses actual transaction data – not estimates – and is commonly viewed as authoritative. The data shows the solar and wind energy costs have decreased dramatically and are lower than other generating alternatives. Energy efficiency programs were not reported by Lazard, but have lower costs than generating resources, provide energy and peak reductions, and do not require transmission or distribution upgrades.

There are significant challenges for the various resource technologies, all of which will be amplified by the increased need from data center loads. These technologies include:

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[10] *Near-term winter resource adequacy challenges in the Pacific Northwest*, Sylvan Energy Analytics, January 2026, https://www.sylvan.energy/s/NW_RA_Study_Review_Final.pdf.
[11] Columbia River Inter-Tribal Fish Commission, *Tribal Energy Vision for the Columbia River Basin* (2022), https://critfc.org/energy-vision

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- **Energy efficiency**. There is potential to increase these programs, but it would require more funding by BPA and individual utilities.
- **Renewable resources**. The recently enacted federal reconciliation law phased out the production tax credits that have been driving the recent increase in renewable resources. The loss of these credits is likely to slow wind and solar power development and increase costs. The current administration is also imposing barriers to solar and wind projects.
- **Demand management**. The region has limited experience with these programs and would need to increase staffing and funding.
- **Storage**. The costs of storage have declined significantly. California has added 7,000 megawatts of storage in the last few years. Storage will require significant investment and integration in grid planning.
- **Conventional methane gas and coal-fired power plants.** These plants are more expensive and generate greenhouses gases and other emissions. Lead times for delivery of new gas turbines range from three[12] to seven years13. State laws in Oregon and Washington set firm limits to reduce and ultimately eliminate these resources.
- **Small modular nuclear reactors**. The industry has been promising this technology for more than 40 years. There are no SMRs operating in the United States. While there are potential projects being discussed, it is unlikely that this technology will be commercially available anytime soon. SMR plants will be more expensive than the sources described above.

Data center energy efficiency. The amount of electricity needed for data centers will depend on the efficiency of the cooling systems. There is significant potential to reduce energy and peak load electricity use which could reduce the range of energy needs. The PAE study on the potential for efficiency improvements found that there is a big difference between the ASHRAE national standard for data center and the best practice technologies for building cooling systems. The study found that the potential savings are equivalent to 2 million to 4 million megawatt hours. These savings are only from building system improvements without any reduction in data center processor quantity.[14]

The study also identified a potential for 1,000 megawatts reduction in peak energy savings from best-practices cooling systems. The study found that evaporative cooling systems are 28% more efficient than current standards; best-practices air-cooled savings are 4% more

[12] Reuters: https://www.reuters.com/business/energy/rush-us-gas-plants-drives-up-costs-lead-times-2025-07-21/.
[13] S&P Glogal: https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/052025-us-gas-fired-turbine-wait-times-as-much-as-seven-years-costs-up-sharply.
[14] Energy & Water Use Impacts of Building System Design for Data Centers, February 2025, https://critfc.org/documents/energy-water-use-impacts-of-building-system-design-for-data-centers/

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efficient. The reports found that air-cooled compressors have large peak loads, especially during summer afternoons and evenings.

Implementing the energy efficiency and peak power reductions identified in the PAE report would provide some of the most significant energy savings available to the region.

Recommendations

1. Delay or refuse data center service to protect reliability and fish-friendly hydro operations.

As discussed above, the rapid growth of large data center loads creates unique risks for the reliability of the power system. Electricity blackouts harm every individual and business and kill migrating salmon. The goal is to ensure resource adequacy.

Utilities have an obligation to serve all customers in their service territories. Some utilities have mechanisms to delay service. The Washington data center legislation had a provision entitled 'Obligation to Serve" that authorized utilities to refuse or delay electricity service:

> to an emerging large energy use facility if the utility determines that providing such service would adversely affect the reliability or affordability of electric service to other ratepayers in its service area, violate the reliability standards established by the North American electric reliability corporation or the western electricity coordinating council, or if the utility has another reason in accordance with state or federal law and consistent with the utility's authority and obligations (Section 3(2)(d) of H.B. 2515)

The original Section 3 of H.B. 2515 also had these requirements for tariffs or contracts to address resource adequacy:

> (4)(c) Demonstrate to the electric utility that the facility has, or plans to have, adequate power supply, either through purchasing electricity from an entity that is not the utility or by generating its own electricity, if the utility does not have adequate power supply for the facility;

Section 4 of H.B. 2515 that passed the House of Representatives had these requirements for tariffs or contracts:

> (5)(c) A requirement that the facility provide, upon request by the electric utility, timely, complete, and verifiable information related to power supply arrangements, load forecasts, operational flexibility, and other system-relevant characteristics, as necessary for the utility to assess system impacts, cost recovery, and how to condition service.

Similar measures should be adopted in Oregon to ensure utilities are required to meet the State's energy laws, policies, and decarbonization goals.

2. Reduce data center loads during peak times and energy emergencies.

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Data centers, because of the size and pace of their energy demands, pose a unique and significant risk to energy reliability. In energy shortages, federal dam operators can reduce or eliminate fish migration protections which results in greater fish mortality. An MIT study found that data centers can shift workloads across time ("temporal flexibility"), reducing grid costs and supporting renewable energy integration.[15] A Duke University study documents a real-world test at an Oracle data center showed 25% peak hour power reduction using software-based load management.[16]

To provide load flexibility, data centers will likely need information on the duration, frequency, and likelihood of interruptions. Utilities and BPA will need new arrangements to use this flexibility to protect consumers and migrating fish. CRITFC supports collaborative efforts with Oregon and other stakeholders to implement provisions that reduce data center loads during power emergencies, thereby protecting migrating fish. Additionally, CRITFC recommends targeted reductions during peak load periods to deliver substantial benefits to the power system.

3. Update electric energy contingency plans.

The Emergency Protocols for the Columbia River Power System include requirements for BPA to take pre-emptive actions to try to secure additional power or reduce loads in anticipation of an energy emergency before it reduces or eliminates spill and reservoir operations for migrating salmon and steelhead. These actions are identified in Attachment 1 of the Emergency Protocols, which is a part of the annual Water Management Plan.[17] The Technical Management Team and BPA need a mechanism to use data center interruptibility and utility emergency measures in support of the grid and to include such in the preemptive actions. Together with Washington, Idaho, and BPA, Oregon should explore the mechanisms that are needed to align BPA's fish operations and emergency preparedness with data center curtailment, flexibility, and associated demand management opportunities.

Oregon updated its Energy Security Plan in 2025[18], Washington's State Curtailment Plan for Electric Energy was updated in 1999[19]. These plans include detailed information on identifying and responding to energy emergencies to protect public health and safety. These actions include potential curtailment of load to various customers depending on the

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[15] https://ceepr.mit.edu/publications/.

[16] https://www.aceee.org/white-paper/2025/10/opportunities-use-energy-efficiency-and-demand-flexibility-reduce-data-center.

[17] Emergency Protocols, Columbia River System, updated December 5, 2025. https://public.crohms.org/tmt/documents/wmp/2026/Appendix/Appendix_1_Emergency_Protocols_20251202.pdf

[18] 2025 Oregon Energy Security Plan. https://www.oregon.gov/energy/safety-resiliency/pages/energy-security-plan.aspx.

[19] Washington State Curtailment Plan for Electric Energy, Chapter 194-22 WAC. https://app.leg.wa.gov/wac/default.aspx?cite=194-22.

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severity of the emergency. These plans should be updated to incorporate actions to interrupt data center loads during electric energy emergencies.

4. Require renewable energy and storage resources for data center loads.
Incorporate the energy efficiency and development recommendations in the CRITFC Energy Vision for the Columbia River Basin into state energy plans and data center regulations. The recommendations are designed to ensure that renewable resources in combination with increased storage, reductions in peak demand, and increased energy efficiency can provide clean, adequate, reliable, and affordable electricity, support the restoration of heathy, harvestable salmon populations, and prevent future damage to salmon and steelhead and other tribal resources caused by the electrical system. A list of the relevant recommendations is provided in appended list of Energy Vision Recommendations. Requiring resource growth for data centers consistent with the CRITFC recommendations will help build a better grid for the future.

5. Improve data center efficiency and reduce overall energy demand.
Data centers should be required to use the most energy efficient processing and cooling technologies commercially available at the time of construction to reduce their energy load and impact on the grid. If evaporative cooling is not feasible, the data center should mitigate energy and peak load impacts using storage or other technologies. The Oregon Department of Energy should develop detailed efficiency standards based on the PAE Study recommendations:

a. Develop a reach code for projects over a certain size that goes beyond the minimum requirements of ASHRAE 90.4 to ensure optimized systems for improved Power Usage Effectiveness (PUE)
b. Creation and adoption of a Peak-PUE metric to encourage selection of systems with reduced peak demand impacts.
c. Encouraging innovation in the data center industry to reduce the overall water impact.
d. Encourage innovation in computation practices and demand modulation to reduce overall energy impacts.

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2022 Energy Vision for the Columbia River Basin

Energy Efficiency and Development Recommendations

Summary

CRITFC's assessment of energy development proposals is guided by the CRITFC Energy Vision for the Columbia River Basin (2022).[20] The Columbia River has a documented history of federal infrastructure development that disregarded tribal treaty rights. A 2024 Department of Interior report concluded the government afforded little if any consideration to the devastation dams brought to tribal communities.[21] The Energy Vision reflects decades of technical expertise in fisheries and river ecosystem management and establishes principles for evaluating whether proposed energy infrastructure is compatible with the long-term sustainability of the Columbia River basin and the protection of tribal resources. Those principles include avoiding harm to salmon, steelhead, Pacific lamprey, and other First Foods that are central to tribal cultures and economies; ensuring that energy development does not degrade cold-water refugia, spawning habitat, or migratory corridors; and requiring rigorous, site-specific environmental review before any infrastructure is built in river systems that support extraordinary biological diversity.

The CRITFC Energy Vision for the Columbia River Basin includes 43 recommendations that are designed to ensure that renewable resources in combination with increased storage, reductions in peak demand, and increased energy efficiency can provide clean, adequate, reliable, and affordable electricity, support the restoration of heathy, harvestable salmon populations, and prevent future damage to salmon and steelhead and other tribal resources caused by the electrical system. The recommendations address these nine major activities.

Improve River Configuration and Operations. The region needs to plan for changes to reduce the damage to migrating salmon and steelhead caused by the Columbia Basin dams, including breaching the four lower Snake River dams.

Amend the Columbia River Treaty. Amend the treaty to include protections for fish and wildlife and expand the scope to include win-win opportunities to integrate renewable resources.

Reduce Peak Loads. Energy Vision details actions to reduce peak demands that can save salmon and money.

Maximize Energy Efficiency. Maintain and expand energy efficiency targets and work to exceed them. Energy efficiency measures are positive for fish and wildlife.

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[20] Columbia River Inter-Tribal Fish Commission, *Tribal Energy Vision for the Columbia River Basin* (2022), https://critfc.org/energy-vision

[21] Tribal Circumstances Analysis: *Historic and Ongoing impacts of Federal Dams on the Columbia River Basin Tribes* (June 2024).

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Harness Renewable Resources. Renewable resources in combination with storage and electric load management can create an environment that is better for fish and wildlife and other tribal resources.

Strategically Site Renewable Resources. Develop a regional plan for where renewable resources should be developed, and where they should not, and to provide expeditious siting with clear and uniform standards across all political subdivisions.

Increase Resource Adequacy. Electricity shortages have reduced protections and funding for fish and wildlife; Section 3 details actions to improve this problem.

Minimize Transmission and Distribution Systems. Load management, energy efficiency, and strategic siting of resources will reduce costs for consumers and damage to tribal resources.

Address the Climate Crisis. Reduce greenhouse gas pollution and continue to increase energy efficiency to try to avoid the devastating effects we are facing.

CRITFC Energy Vision Relevant Recommendations

The Energy Vision for the Columbia River Basin includes detailed findings, rationales, and recommendations. This section summarizes the relevant recommendations.

Reduce Peak Loads

Recommendation 4: The Council, BPA, and utilities should include the peak savings and reductions in transmission and distribution benefits in calculating the capacity value of energy efficiency programs.

Recommendation 5: Northwest public utility commissions should implement time-of-use rates to send an appropriate price signal that captures the dramatically different costs of using electricity during different times of the day.

Recommendation 6: Utilities should use demand response to manage system loads, reducing peak loads, ensuring reliability by encouraging customers to reduce demand during peak periods or shift loads from peak to off-peak hours.

Recommendation 7: Automobile manufactures should include systems that allow electric vehicles to schedule charging during off-peak periods.

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Recommendation 8: Utilities should integrate electric vehicle charging and batteries into the power system to reduce costs to consumers and the power system and improve salmon migration.

Recommendation 9: BPA and utilities should work to improve the efficiency of electric vehicles.

Recommendation 10: The Council, BPA, and utilities should fund the incremental costs of heat pump water heaters to stimulate the adoption of this technology.

Recommendation 11: Utilities and BPA should develop and fund programs to schedule when water heaters operate.

Increase Electricity Storage

Recommendation 12: BPA and utilities should implement utility-scale battery projects.

Recommendation 13: BPA and utilities should implement incentive programs to expand the use of on-site batteries.

Recommendation 14: BPA and utilities should fund programs to reduce peak loads using the thermal mass of buildings.

Recommendation 15: The Council and utilities should not pursue potential pumped storage sites unless they are consistent with the siting criteria described in Section 3.6.

Recommendation 16: Utilities and the Council should continue to monitor green hydrogen technologies.

Maximize Energy Efficiency

Recommendation 17: The Council should increase the conservation targets in the 8th Power Plan to maintain at least the level of activity called for in the 7th Plan and work with BPA and utilities to try to exceed the targets.

Recommendation 18: The Council should monitor the implementation of energy efficiency programs to ensure that utilities meet the conservation targets.

Recommendation 19: All tribal homes and businesses should be fully weatherized by 2025 and all tribal homes and businesses should receive solar panels and battery systems that provide zero net energy by 2030.

Recommendation 20: Utilities should weatherize and achieve net zero energy for all low-income homes by 2035.

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Recommendation 21: Utilities, the Northwest Energy Efficiency Alliance, and other organizations should implement comprehensive programs to improve energy management practices in the commercial and industrial sectors.

Harness Renewable Resources & Integrate/Synergize with Electricity Storage

Recommendation 22: Congress, state legislatures, the Council, and public utility commissions should review programs to reduce greenhouse gases to avoid unintended consequences.

Recommendation 23: The Council should analyze the integration of renewable resources under a range of scenarios for river operations.

Recommendation 24: Utilities and BPA should continue to pursue wind, and the associated efforts to integrate wind power, consistent with the tribal concerns and protections for fish, wildlife, and cultural resources.

Recommendation 25: The region should expand its efforts to promote utility-scale solar energy.

Recommendation 26: BPA and utilities should fund proof of concept projects for dual use solar.

Recommendation 27: States, local governments, and utilities should expand policies to promote on-site solar systems.

Recommendation 28: The Council, Northwest legislatures, energy regulators, and utilities should consider adopting zero net energy building standards.

Recommendation 29: State and local governments should adjust building codes to ensure that they can accommodate on-site batteries.

Recommendation 30: The Council, BPA, and utilities should continue to monitor and support other promising renewable resources.

Strategically Site Renewable Resources

Recommendation 31: CRITFC and its member tribes should work with state energy and siting agencies, federal agencies, Northwest Grid, the Northwest Power Pool, and others to develop a comprehensive plan for siting renewable resources and transmission lines that builds in efforts currently being developed in the states.

Increase Resource Adequacy

Recommendation 32: The Northwest Power Pool Resource Adequacy Program should address fish and wildlife protections by increasing electric system reliability while minimizing pressure on the existing hydroelectric system as the *de facto* fallback. In the

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near term, these reserves are likely to require having combustion turbines on standby. There may be opportunities to fuel these plants with biofuels that reduce their net carbon footprint. While CRITFC strongly supports the long-term elimination of all fossil fuels to address the climate crisis, in the near term, there may be circumstances where the choice is burning some natural gas or shutting down river operations and killing migrating salmon. CRITFC supports rate treatment for the costs associated with maintaining, staffing, fuel contracts and fuel storage, and other costs for these resources.

Recommendation 33: The California Public Utilities Commission and the California Independent System Operator should address reliability issues in California that could affect the Northwest.

Recommendation 34: BPA and Congress should address repayments to the Treasury to avoid curtailment of fish and wildlife protections.

Recommendation 35: The Pacific Northwest utilities, states, and federal agencies should closely monitor West Coast energy market developments to ensure that they address impacts on Columbia Basin Fish and Wildlife and other tribal resources.

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Data Center Water Impacts

Local Stress, Regional Trends, and Cumulative Impacts

Policy Paper & Recommendations

Columbia River Inter-Tribal Fish Commission

The rapid expansion of data center facilities has resulted in greater pressures on local water resources and poses significant risks to the region's overall water security. The scale of potential new developments in the Pacific Northwest and the urgency of these cumulative impacts demands immediate attention. Data center operations directly affect rivers, aquifers, and municipal supplies, with new demands and consequences that extend far beyond the facility gates: from increased water withdrawal and thermal discharge to heightened carbon and heat emissions. These facilities not only consume vast volumes for construction, cooling, and maintenance, but also indirectly drive water use through related technology manufacturing processes and the energy production required for their operations. This growth in land and energy use not only raises water demand but also contributes to higher carbon and heat emissions, highlighting the interconnected environmental challenges posed by data centers.

Water consumed during operation is used to cool facilities and equipment from the heat generated by the computational workloads of servers. Data center facilities then discharge water that is often warm, which, when released into nearby waterways, can exacerbate stress on river systems and contribute to long-term ecological damage, particularly in the context of climate change and increasing pressure on aquatic habitats. Further, recent research reveals that data centers emit substantial airborne heat during operations, particularly when backup generators are engaged, creating a data center heat-island effect that impacts surrounding resources. The ecological stakes are high, as heated water and air are directly additive to existing, long term trends of global warming and drought. Every new data center can reshape local hydrology, stress aquatic habitats, and challenge regional water security.

Evaluating the water impacts of data centers must begin with recognizing that facility location is a critical variable. Water availability, pollution levels, and the presence of sensitive species and habitats vary dramatically from one community to the next, making siting decisions central to environmental outcomes. Transparency is equally critical; companies must provide clear, public information about their water use, cooling technologies, and facility systems so stakeholders and regulators can assess risks, identify improvements, and request solutions. Strong government oversight is needed, with enforceable regulations that protect water resources and ensure accountability. Given the highly localized and cumulative nature of these impacts and considering the severe drought conditions persisting in the Pacific Northwest, policymakers should consider implementing a regional pause on permitting new data centers. This approach is

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essential to safeguarding water supplies, supporting ecosystem health, and ensuring equitable outcomes for all users.

To assess the water footprint of data centers, as a starting point it is important to distinguish between the different phases of water impacts which present their own unique challenges. First, the facility withdraws water (the "input" to the facility) where it consumes the water as liquid cooling and waste evaporation. These pieces are characterized as the facility's "water use". Next, most if not all facilities, at some point in their process, will discharge water (the "output"). This discharge may include heat and chemical pollutants, which raise water quality concerns. The water footprint can also include indirect water impacts, such as the water used in generating the electricity to power the data centers, or the water used to mix the concrete for the expansive facility campuses. This paper highlights these phases and suggests questions that policymakers should assess before approving the construction of a data center facility in their locality.

RECOMMENDATIONS

1. Transparency, Regulation, and Comprehensive Monitoring

A facility's water footprint is shaped by factors such as its purpose, design, location, and power and water sources. Data centers must be transparent about their water use, water discharge plans, and chemical usage, publicly reporting water-related impacts to state and local regulatory bodies so that agencies, local governments, impacted communities, and tribal sovereigns can evaluate risks and necessary mitigation measures. Oregon should require mandatory, comprehensive monitoring of water quality, including thermal effects and chemical contamination with daily reporting of intake, consumption, and effluent volumes to ensure accountability. Data centers should use the best available technologies to minimize water consumption and protect aquatic ecosystems. Any connections to municipal water or wastewater systems must be preceded by an assessment of system capacity and proof that upgrades will not lead to untreated discharges into waterways. Furthermore, the state should establish siting restrictions to prevent water-intensive development in critical fish habitats, protecting salmon and other cold-water species from irreparable harm.

2. No-Net Impact

Approval of data centers should require demonstration of no net impact on watershed flows, temperatures, pollution levels, and treaty-protected fishery resources. Water rights and allocations must not be granted unless enforceable fish protection measures are guaranteed, and allocation criteria should prioritize treaty-protected resources. Additionally, regulatory frameworks should be sector-specific, with robust monitoring programs and cumulative impact assessments that account for existing over-allocation,

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climate change projections, and the cumulative effect of all water uses on ecosystem health. Before siting decisions, the state should conduct thorough economic and environmental analyses, assess potential transfer and impairment of existing water rights, and avoid diverting municipal water for non-municipal purposes. No water resources should be allocated to data centers unless it can be demonstrated that such use would not affect treaty resources, local municipal water security, or watershed health, including stream flows for anadromous species, temperature, and pollution. By synthesizing the detailed requirements from the first version with the broader regulatory and cumulative impact considerations from the second, this version addresses both reviewers' concerns and provides a clear, actionable framework.

WATER ASSESSMENT

Data Center Facility Systems

Data center facilities vary widely in their design, cooling technologies, and resulting impacts on water resources.[1] Air -cooled systems rely primarily on forced air, which reduces direct water use but increases overall energy demand. In contrast, evaporative cooled systems are more energy efficient but require significantly more water withdrawal and consumption. "Open- loop, once- through" cooling systems withdraw very large- volumes of water and discharge it back into local waterways at elevated temperatures, creating potential thermal pollution concerns. [2] As the computing load required for artificial intelligence continues to grow, mid-sized facilities can use hundreds of thousands of gallons of water daily.[3] Meanwhile, much larger, so-called hyperscale data centers, built to serve AI training and other large computational workloads can consume millions of gallons per day and billions annually, rivaling the water needs of small cities.[4]

Server density and computational workload, cooling methods, and other operational choices drive a facility's overall water footprint, which includes direct withdrawals, onsite consumption through evaporation, and the amount of water needed to generate electricity that powers data center operations. Closed loop systems may recycle water internally but

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[1] PAE Engineers, *The Energy & Water Use Impacts of Building System Design for Data Centers: Design Considerations for Oregon & Washington,* CRITFC (Feb. 14, 2025). https://critfc.org/wp-content/uploads/2025/03/data-center-report.pdf

[2] Khan, Shahzaib, *et al*., *When the Cloud Warms the River: A Call for Monitoring Data Cetner Impacts in the Age of AI*, University of Washington (2026).

[3] Copley, Michael, *Data centers, backbone of the digital economy, face water scarcity and climate risk*, NPR (Aug. 30, 2022)(Mid-sized facilities can use up to 300,000 gallons of water each day); *see also* Md Abu Bakar Siddik et al 2021 Environ. Res. Lett. 16 064017l, https://iopscience.iop.org/article/10.1088/1748-9326/abfba1/pdf.

[4] Yanez-Barneuvo, Miguel, *Data Centers and Water Consumption*, Environmental and Energy Study Institute (EESI) (June 25, 2025). *See also* Silverstein, Ken, *America's AI Boom is running into an unplanned water problem*, Forbes (Jan. 11, 2026).

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still require substantial volumes of water during construction, commissioning, and early phases of operation. Additional water is often used in chiller plants, humidification systems, and for managing dust and concrete work during buildout, sometimes over multiple years. The type of water source, such as surface water, groundwater, municipal supply, or reclaimed water, also shapes the scale and severity of impacts. Despite growing interest in recycled water systems, reclaimed or non-potable sources remain relatively uncommon across the industry, even though they could decrease the strain placed on rivers and municipal and agricultural water supplies, depending on local conditions.

Together, the type of facility, including its purpose and workload, cooling technology, and power source, defines a data center's relationship with water systems, dictating not only how much water is withdrawn and consumed but also how much heat or chemical laden wastewater may be discharged back into the environment. These facility- level design decisions have significant implications for regional water availability, aquatic ecosystems, and downstream users, particularly in water stressed areas or locations where data centers cluster and compete with agricultural, industrial, municipal, and tribal water needs. As data centers continue expanding to meet rising digital and AI driven demand, understanding these facility types and the tradeoffs they impose is critical to assessing their water impacts and identifying potential solutions.

Questions to Consider When Evaluating Data Center Facilities

General Facility Evaluation

- What cooling systems are used in the facility (e.g., air-cooling with forced air, water-cooling with evaporative methods, or alternative technologies), and how do these choices affect water withdrawal and consumption?
- What is the overall size and capacity of the data center or campus, including the number of servers, square footage, and projected growth? How much water will be consumed in construction?
- Will the facility create new impervious surfaces, potentially affecting watershed hydrology and health, or will it be sited on an existing industrial footprint?
- How efficient is the facility's design and operation in terms of water and energy use, and what metrics (such as Power Usage Effectiveness or Water Usage Effectiveness) are tracked to monitor performance?

Power Use and Water Impact

- What is the facility's total power demand, and how does this translate to indirect water use associated with electricity generation?[5]
- What are the average and peak power consumption figures (annual, monthly, daily), and how do these impact water resources during periods of high demand?
- Who is the facility's utility provider, and what are its sources of power (renewable, fossil fuel, hydroelectric, etc.) and (if hydro) commitments to environmental flows or fish-friendly generation?

[5] PAE Engineers, *Energy & Water Use Impacts*, supra note 2.

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- What new generating resources are attributed to the data center, and how does the choice of power source affect the facility's indirect water footprint?
- Does the facility have onsite power generation, backup systems, or energy storage (such as diesel/gas generators, solar panels, or battery storage), and what are their implications for water and air quality?
- What are the facility's peak energy usage patterns, and how do load fluctuations during extreme temperature days impact water demand and stress on local resources and communities?

Water Use in Data Centers (Water Input and Consumption)

Water is a critical resource for data centers, whose facilities rely on substantial water inputs for cooling, construction, and energy generation. Data centers' water footprints extend beyond direct consumption, and include indirect demands associated with power production and chip manufacturing.[6] As the scale and density of data centers accelerate, understanding water use is a priority. This includes water sources, consumption patterns, and regional effects.

Direct Water Use

Data centers directly withdraw water for operational cooling, construction, and site preparation. Cooling systems, especially evaporative cooling, are major drivers of water consumption, with closed-loop systems offering opportunities for recycling but still requiring significant volumes during initial construction phases.[7] Water is also used in chiller plants and humidification systems to regulate internal temperatures, with evaporation accounting for much of the consumptive loss.[8] Water sources options are typically surface water, groundwater, municipal supplies, and, less commonly, reclaimed or non-potable water, which may help mitigate impacts depending on local availability.[9] A standard 100 MW data center can use up to 100 million gallons of water, enough for 2,500 people's domestic use.[10]

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[6] Li, Pengfei *et al, Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models*, UC Riverside (Mar. 26, 2026).

[7] Skibell, Arianna, *A data center drained 30M gallons of water unnoticed — until residents complained about low water pressure*, Politico (May 7, 2026)(Closed-loop systems can use significant amounts of direct water use during construction and early phases of operation before they are able to settle into normal operations. This can include concrete work, dust control, and site preparation, which can take years).

[8] Rao, Pallavi, *Ranked: Google's Thirstiest Data Centers*, Visual Capitalist (Feb. 4, 2025), Yanez-Barneuvo, Miguel, *Data Centers and Water Consumption*, Environmental and Energy Study Institute (EESI) (June 25, 2025).

[9] ESG News Ed. Team, *AWS Expands Recycled Water Use to Over 120 Data Centers Across the U.S.*, ESG News Survey (Nov. 6, 2025).See also, Siddik, Md Abu Bakar, *et al.*, *The environmental footprint of data centers in the United States*, Environmental Research Letters 16 064017 (May 21, 2021).

[10] Calculations based on Water Use Efficiency figures from Shehabi et al. (2024), at note 1, https://escholarship.org/uc/item/32d6m0d1. 5.; Water Use Data for Washington, U.S. Geological Survey (page last modified July 23, 2025) (Assuming 107 gallons per household per day, or 39,055 gallons per year),

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Indirect Water Use

Beyond onsite consumption, data centers have an "indirect" water use burden from the energy sources powering their operations. This indirect use must be considered, because it is a continuous additional burden on the region's water supply. Power generation, especially from fossil fuels, nuclear, and hydropower, involves substantial water withdrawals for cooling and steam processes.[11] The water footprint of a data center thus depends on both its operational design, and the lifecycle demands of its power supply.

General Considerations for Water Use

Water Usage Effectiveness (WUE) is a potential metric for tracking and optimizing water use in data centers, calculated as the ratio of total water consumed to energy used by IT equipment.[12] Water usage varies by location, climate, facility size, and chip density, with higher densities and AI workloads increasing cooling needs. [13] Alternative cooling strategies, such as air-cooled systems, liquid immersion, or leveraging natural cooling in colder climates, may reduce water demand but can increase energy use.[14] Data centers are frequently cited in regions facing water stress, amplifying local concerns about resource availability and transparency.[15] Indeed, some data centers seem to be using more water than they disclose and communities are being caught unaware, resulting in less water available for municipal water users.[16] Data Centers situated in warmer regions necessitate additional cooling, which can create a feedback loop and lead to increased local water consumption.[17]

Regional Concerns: Reduced Snow Storage and Increasing Drought

The 2025–2026 water year has been extreme by any measure. Spring and summer 2025 were unusually hot and dry, compounding an existing regional moisture deficit, and this

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https://waterdata.usgs.gov/wa/nwis/water_use. *See also,* International Energy Agency (IEA), *Energy and AI*, at 242, Box 5.4 (2025). For reference, try the "Water Use Calculator" https://www.tapsrundry.com/data-center-water-consumption-calculator

[11] Guidi, Gianluca, *et al*, Environmental Burden of United States Data Centers in the Artificial Intelligence Era, Harvard T.H. Chan School of Public Health (Nov. 14, 2024).

[12] Tozzi, Christopher, *A Guide to Data Center Water Usage Effectiveness (WUE) and Best Practices*, DataCenter Knowledge (January 17, 2025).

[13] Yanez-Barneuvo, Miguel, *Data Centers and Water Consumption*, Environmental and Energy Study Institute (EESI) (June 25, 2025).

[14] Yanez-Barneuvo, Miguel, *Data Centers and Water Consumption*, Environmental and Energy Study Institute (EESI) (June 25, 2025).

[15] Walker, Carla, and Goldsmith, Ian, *From Energy Use to Air Quality, the Many Ways Data Centers Affect US Communities*, World Resources Institute (Feb. 17, 2026). See also, Rao, Pallavi, *Ranked: Google's Thirstiest Data Centers*, Visual Capitalist (Feb. 4, 2025)(In 2023, Google's Council Bluffs data center in Iowa consumed approximately 980 million gallons, while its U.S. data centers collectively used over 6 billion gallons).

[16] Skibell, Arianna, *A data center drained 30M gallons of water unnoticed — until residents complained about low water pressure*, Politico (May 7, 2026).

[17] https://www.epa.gov/heatislands/what-are-heat-islands, M. Santamouris, *Recent Progress on Urban Overheating and Heat Island Research: Integrated Assessment of the Energy, Environmental, Vulnerability and Health Impact: Synergies with the Global Climate Change*, 207 Energy & Bldgs. art. 109482, at 1 (2020).

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was followed by the warmest December on record in Washington, statewide, with mean temperatures the warmest since at least 1895.[18] Roughly three-quarters of Cascade runoff originates as snowpack.[19] The shift from snow to rain during a series of atmospheric rivers in December 2025 filled reservoirs in the short term but did little to bank water for summer, as much of the snow accumulation melted from the warmer rainfall. Earlier, during the summer of 2025, Yakama Nation's Wapato Irrigation Project had severely reduced irrigation to preserve water in regional reservoirs.[20] Unfortunately, storage in the Yakima Project's five reservoirs fell to 8%, so in October 2025, Washington restricted surface water use across the Yakima River Basin.[21] These reservoir levels were among the lowest on record, forcing Washington to cut off senior right holders.[22]

Oregon is experiencing record low snowpack. Snow conditions did not improve during the winter months of 2026. By April 1, 2026, Oregon's statewide average snow water equivalent (SWE) was the lowest on record since 1981, and Arizona, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming all set new record-low April 1 SWE values.[23] Oregon's basin SWE ranged from 36% in the Middle Columbia Basin to fully 0% of median in the John Day Basin (meaning none of John Day's usual snowpack will be available in summer flows).[24] Statewide SWE in Oregon set a new record low for both the SNOTEL record and the longer 98-year snow-course record, surpassing even the historic lows of 1977 and 2015, with a spring-summer water supply outlook rated poor statewide and a high probability that runoff volumes at most forecast points would fall within the lowest 15% on record.[25]

This snow drought, layered on multiple prior dry years, pushed Washington to issue a fourth consecutive statewide drought emergency on April 8, 2026, after a warm winter left the state with about half its usual snowpack despite 104% of normal precipitation.[26] State climatologists have linked the pattern to a rising frequency of "snow droughts," from

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[18] UW Office of the Washington State Climatologist, *December 2025 Climate Summary* — https://climate.uw.edu/2026/01/12/december-2025-climate-summary/
[19] D. Li et al., "How Much Runoff Originates as Snow in the Western United States, and How Will That Change in the Future?," *Geophysical Research Letters* 44, no. 12 (2017): 6163–6172, doi.org.
[20] Questen Inghram, *"This is unprecedented": Ecology restricts surface water use in the Yakima River Basin*, Washington State Standard, Oct. 3, 2025. https://washingtonstatestandard.com/2025/10/03/this-is-unprecedented-ecology-restricts-surface-water-use-in-the-yakima-river-basin/
[21] Washington State Department of Ecology, "Statewide drought declared due to dismal snowpack," Ecology.wa.gov, April 8, 2026, https://ecology.wa.gov/about-us/who-we-are/news/2026/april-8-statewide-drought-declared-due-to-dismal-snowpack
[22] *Id.*
[23] National Integrated Drought Information System (NIDIS), "Snow Drought Current Conditions and Impacts in the West," Drought.gov, April 9, 2026, drought.gov.
[24] *Id.*
[25] *Id.*
[26] Washington Department of Ecology, "Statewide Drought Declared", note 21 supra.

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roughly twice a decade historically to about four times a decade now, with a projected seven times a decade by the 2050s.[27]

These compounding deficits reflect a longer-term trend rather than a single bad year. The 2025 water year itself ranked as the fourth warmest and 38th driest in the Pacific Northwest's 130-year historical record. Spring 2025 ranked the fourth driest and 10th warmest on record regionally.[28] Regional water managers increasingly frame this as evidence that existing infrastructure and management frameworks, built around historical climate conditions with snowpack acting as reliable natural storage, are no longer matched to current conditions.[29] It is clear that improved water resilience planning is needed for the region, and careful consideration needs to be given to any proposal, such as the development of a data center, that will significantly increase water consumption.

Oregon's Water Rights System

In Oregon, many data centers are connected to municipal water systems, using a city's broad rights to secure water for large-scale operations.[30] This arrangement increases pressure on local resources, as municipal water demand for industrial use can far exceed residential needs. Unlike agricultural or industrial water rights, in Oregon, municipal rights allow cities to acquire and save water rights for anticipated future growth.[31] Cities may hold permitted water rights that are not immediately put to beneficial use, giving them extended timelines to develop and expand.[32] This flexibility means municipalities can accumulate water rights beyond current needs, and are permitted to purchase senior rights from other users.[33] Data centers using municipal rights are classified under a broad industrial customer category, which may be bundled with manufacturers and other industries.

One regional data center that has an outsized impact on municipal water is Google's facility in The Dalles along the Columbia River. This facility consumed 302 million gallons in 2023 and 550 million gallons in 2025, ranking among the most water-intensive centers

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[27] Municipal Research and Services Center (MRSC), "Planning for Drought: Lessons from Washington Communities," MRSC Insight, June 10, 2026, https://mrsc.org/stay-informed/mrsc-insight/june-2026/planning-for-drought

[28] Office of the Washington State Climatologist, *Pacific Northwest Water Year 2025 Impacts Assessment*, Climate.uw.edu, April 7, 2026, https://climate.uw.edu/2026/04/07/pacific-northwest-water-year-2025-impacts-assessment-released

[29] UW Climate Impacts Group / NOAA NIDIS, *Pacific Northwest Water Year 2025 Impacts Assessment*, released April 2026 — https://climate.uw.edu/2026/04/07/pacific-northwest-water-year-2025-impacts-assessment-released/

[30] It is our understanding that data centers located in municipal areas using municipal water systems include Google in the Dalles, Meta in Prineville, and facilities in Hillsboro.

[31] ORS § 540.610(5).

[32] Todd M. Peplin & María Isabel Zamora Re, Or. State Univ. Extension Serv., *Water Rights and Water Law: Using Your Irrigation Water Legally*, Tech. Guide 2, Pub. No. EM 9521 (2026), Oregon State University Extension Catalog

[33] *See, e.g.,* ORS § 540.530. However, transfers or withdrawals must not harm other water users or ecological functions.

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nationally.[34] While residential water demand in The Dalles remained steady, the Google facility consumed 40% of available municipal water. To meet this demand, the city is currently seeking to increase water supply by acquiring U.S. Forest land and tapping into a watershed that provides cold water to the Columbia River and supports salmonids.[35] This scenario highlights how tapping into municipal water resources enable data centers to secure substantial water supplies, effectively expanding the footprint of water use in an area at the expense of downstream users, instream flows, and habitats. This also highlights the dilemma of communities facing reductions in the natural water supply due to heat and drought, water that is needed to support a diversity of uses.

Oregon's water rights system key principles include beneficial use, priority, and protection of instream flows. Instream water rights, held in trust by the state, are specifically designed to preserve water for fish, wildlife, and habitat conservation.[36] Although Oregon's instream water rights are intended to protect fish and habitats, their effectiveness is limited by weaker priority dates and the ability of municipalities to secure and transfer water rights. If a transfer reduces water available for instream rights or harms habitats, the transfer should be denied.[37] The lack of early priority dates, however, often leaves instream flow protections vulnerable to increasing municipal and industrial demands.

Sadly, Oregon has fallen well short of its obligations: the state has over-allocated surface and groundwater sources and has inadequately tracked existing water rights, leaving legal protections largely unenforced.[38] Oregon's 2025 Integrated Water Resources Strategy highlights these and other shortfalls, emphasizing the need to address a future of water scarcity and recommending the state to act with "urgency" to protect instream and out-of-stream uses.[39]

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[34] Rao, Pallavi, *Ranked: Google's Thirstiest Data Centers*, Visual Capitalist (Feb. 4, 2025). *See also*, Rogoway, Mike, *More Oregon water for Google's data centers, more concern over secrecy*, The Oregonian (Apr. 6, 2026).

[35] Ehrlich, April, *As Google's water demands grow, The Dalles aims to pull more from Mount Hood forest*, Oregon Public Broadcasting (Jan. 15, 2026), *see also*, Ehrlich, April, *The Dalles' mayor called OPB's data center story inaccurate. Here are the facts*, Oregon Public Broadcasting (Jan. 23, 2026).

[36] Oregon Water Res. Dep't, *Water Rights in Oregon: An Introduction to Oregon's Water Laws* (2018). https://www.oregon.gov/owrd/WRDPublications1/aquabook.pdf , Oregon Revised Statutes (ORS) §§ 537.332 & 540.530. Oregon adopted the Instream Water Rights Act in 1987, but priority dates range depending on when rights were converted from older rights or created anew.

[37] Oregon Administrative Rules (OAR) 690-380-5030 holds that if a water right transfer reduces water available downstream for an instream water right, alter stream conditions needed for fish spawning, rearing or migration, then the transfer can be denied.

[38] *See* Ben Scandella & Justin Iverson, Oregon Water Resources Department, Oregon Groundwater Resource Concerns Assessment 15 (2021). *See also* Or. Water Res. Dep't, *Oregon's 2025 Integrated Water Resources Strategy* IN, at 7 (2025)("Approximately 10,000 river miles in Oregon are covered by an instream water right, but the state has limited capacity to monitor whether instream water rights are being met").

[39] Or. Water Res. Dep't, *Oregon's 2025 Integrated Water Resources Strategy* IN (2025), https://www.oregon.gov/owrd/programs/Planning/IWRS/Documents/2025%20IWRS_w%20appendices.pdf

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Without corresponding action, these statements lack value. In the same 2025 strategy, data center water use is only addressed through two superficial options: it suggests developing a "energy/water nexus efficiency program" and exploring other beneficial uses of data center cooling water.[40] Neither of these options directly tackle the escalating impact these facilities have on Oregon's water supply.

With hyperscale data centers consuming hundreds of millions of gallons annually, sometimes rivaling the usage of entire communities, Oregon must move beyond vague recommendations and enact real safeguards to protect water resources. Policymakers need to prioritize strong instream rights, require transparent reporting, enforce meaningful metrics, and demand proactive planning. If Oregon continues to treat data center water consumption as an afterthought, the state risks trading ecological health for unchecked economic growth. It's time for urgent action to ensure that water for fish, wildlife, and future generations isn't sacrificed for short-term gains.

Questions When Evaluating Data Denter Impacts on Available Water

Characterize the Water Use

- What are the facility's systems and their direct water requirements across construction, commissioning, and full operation?
- What is the typical water withdrawal rate (annual, monthly, daily), and how does it fluctuate by season or workload?
- How much water is consumed versus returned, and in what physical and chemical condition is it returned to the environment or municipal system?
- What is the indirect water demand associated with the facility's power sources, and has the full lifecycle water footprint, including upstream energy generation, been evaluated?
- What is the facility's Water Usage Effectiveness (WUE), and how is it tracked and optimized over time?

Describe the Source of Water

- Is the facility's water sourced from surface water, groundwater (aquifer), or municipal supply, and what are the implications for local resource availability?
- If using municipal supply, does the municipality have sufficient water to reliably serve the facility, including permitted but unperfected water rights for future expansion? And to what extent do the supplier's long-term plans account for future climate uncertainty vs. rely on historic hydrology/supply assumptions?
- If seeking or purchasing water rights, are these new or existing permits, and what are the specific conditions regarding beneficial use, timing, and reporting?

[40] Oregon 2025 IWRS at p.113, App. D p.24 (Critical Issue: Water and Energy, Action 4C) & App. D p.44 (Critical Issue: Water Use and Management, Action 10B).

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- Will the project activate, transfer, or modify existing water rights in ways that reduce instream flows or affect downstream users and habitats elsewhere in the watershed?
- What is the hydrological connection between the water source and nearby salmon-bearing streams or other sensitive aquatic habitats?

Flow Conditions and Fish Needs

- Under what conditions, such as drought, low-flow years, or projected climate change, could withdrawals reduce streamflows below levels needed for fish passage, spawning, or rearing?
- Will the project impact instream flows elsewhere in the watershed, and how will these impacts be monitored and avoided?
- What is the cumulative impact of withdrawals when combined with existing agricultural, municipal, and industrial users within the same watershed?
- How will water demand change if the facility scales up or extends its operational lifespan beyond initial projections?
- Have tribal water rights and instream flow requirements been specifically considered and addressed in the project's planning and permitting?
- Has government-to-government consultation occurred, including discussion of the development's potential impacts to tribal reserved water rights and treaty resources?

Water Quality and Discharge Impacts (Water Output)

The expansion and operation of data centers have introduced complex challenges to water quality, discharge management, and watershed health. Since these facilities consume water primarily for cooling purposes, the result is significant thermal and chemical outputs that interact with local and regional water systems. While the scale of these impacts is not yet fully understood, emerging research and field observations highlight measurable changes in ambient temperature around data center clusters.

Thermal Pollution

Data center use of waterless cooling systems is an emerging technology and has not been adopted for all climates or data center designs. As a result, many data centers continue to rely on water-based cooling systems that require substantial amounts of water to cool equipment. Waste heat is commonly dissipated through cooling towers but cooling water discharge at elevated temperatures can also be discharged directly to municipal wastewater systems and surface waters.[41] Uncertainties surrounding the environmental impacts of discharging cooling water and data gaps created by lack of transparency in

[41] Kim, Katherine. "Data Center Cooling Water Discharge." *Hastings Environmental Law Journal* 32, no. 2 (2026). https://repository.uclawsf.edu/hastings_environmental_law_journal/vol32/iss2/4/

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cooling water discharge is troubling as thermal discharge can alter ambient water temperatures, creating stress for aquatic ecosystems, particularly in sensitive or low-flow waterways.[42]

Small increases in river temperature can cause thermal stress and halt migration for salmon, steelhead, and other cold-water fish. It can also reduce dissolved oxygen levels, which is vital for fish survival, and stimulate harmful algal blooms and invasive species growth.[43] Preliminary studies show that hyperscale facilities may contribute to localized river warming.[44] Other studies are showing that land surface temperatures around data centers rise by approximately 2°C averaged over time, a phenomenon described as the "data heat island effect."[45] The U.S. EPA recognizes that heat islands can affect temperatures of nearby waterbodies.[46] In addition, heat islands are known to trigger a feedback loop, requiring increased energy to power cooling systems, resulting in more water use.[47] These trends are sufficiently observable to warrant investigation for their localized impacts on water temperatures.

Chemical Contaminants

Industrial cooling systems in data centers require a suite of chemical treatments to prevent scaling, corrosion, and microbial growth. These include refrigerants (such as hydrofluoroolefins and hydrochlorofluoroolefins), cooling loop chemicals like ethylene glycol, and a range of water treatment additives, including nitrites, molybdates, borates, azoles, phosphates, polymers, and hydrogen peroxide.[48] The U.S. Environmental Protection Agency (EPA) announced in September 2025 the prioritization of new chemical reviews under the Toxic Substances Control Act (TSCA) for data center applications.[49]

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[42] *Ibid*.

[43] Khan, Shahzaib, et al., *When the Cloud Warms the River: A Call for Monitoring Data Center Impacts in the Age of AI*, University of Washington, at 2 (2026). *See also*, Johnson, M. F., et al., Rising water temperature in rivers: Ecological impacts and future resilience. 265 *WIREs Water*, *11*(4), e1724 (2024). https://doi.org/10.1002/wat2.1724

[44] *Ibid*. *See also,* Hossain, Faisal, *How AI clouds the future of WA's rivers*, The Seattle Times (Jun. 7, 2026)(Preliminary data showed increases of 2.5°C near some data center facilities).

[45]Andrea Marinoni et al., *The Data Heat Island Effect: Quantifying the Impact of AI Data Centers in a Warming World*, ARXIv (Mar. 21, 2026), https://arxiv.org/abs/2603.20897. *See also*, Hawkins, Samantha, *Press Release: Analysis Finds Box Elder Data Center Could Release as Much Heat as 23 Atomic Bombs Per Day*, Grow the Flow, (May 7, 2026). https://growtheflowutah.org/2026/05/07/press-release-analysis-finds-box-elder-data-center-could-release-as-much-heat-as-23-atomic-bombs-per-day.

[46] https://www.epa.gov/heatislands/what-are-heat-islands. *See also,* C. Zahn et al., *The Hydrological Urban Heat Island: Determinants of Acute and Chronic Heat Stress in Urban Streams*, 57 J. Am. Water Res. Ass'n 941, 941–55 (2021).

[47] https://www.epa.gov/heatislands/what-are-heat-islands, M. Santamouris, *Recent Progress on Urban Overheating and Heat Island Research: Integrated Assessment of the Energy, Environmental, Vulnerability and Health Impact: Synergies with the Global Climate Change*, 207 Energy & Bldgs. art. 109482, at 1 (2020).

[48] Soliman, M., Alhaj, M., et al. *Treatment Technologies for Cooling Water Blowdown*. Sustainability 14(1):376, 2021.

[49] U.S. Environmental Protection Agency, *EPA Prioritizes Review of New Chemicals Used in Data Center Projects, Supporting American Manufacturing and Technological Advancement,* (Sept. 18, 2025).

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While expedited TSCA review may facilitate innovation, it can only be protective if the statutory unreasonable-risk standard is applied rigorously; otherwise, prioritization risks reducing the depth of hazard, exposure, and release analysis. This issue is uniquely important for tribal communities, as their significantly higher rates of fish consumption dramatically elevate their exposure to hazardous aquatic chemicals.[50]

Water that has been cycled through the data center cooling system several times is classified as blowdown and generally contains higher concentrations of total dissolved solids, salts, chlorides, and other contaminants.[51] Data center wastewater streams often contain constituents not typically present in residential or light commercial flows, including glycols, heat-transfer fluids, corrosion inhibitors, biocides, cleaning solvents, scale inhibitors, and elevated metals (such as copper, zinc, and chromium).[52] Wastewater containing these chemicals may be discharged to municipal wastewater treatment plants (Publicly Owned Treatment Works, or "POTW") or directly to surface water bodies under National Pollutant Discharge Elimination System (NPDES) permits. Several classes of these cooling-system chemicals are known to be incompletely removed by conventional municipal wastewater treatment processes and these constituents may pass through treatment systems into receiving waters, accumulate in biosolids, or interfere with biological treatment processes, creating potential pathways for ecological exposure and regulatory concern.[53] Residents of some communities near data centers have found their water contains excess sediment, nitrates, and per- and polyfluoroalkyl substances (PFAS).[54]

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[50] *See, e.g.,* Columbia River Inter-Tribal Fish Commission (CRITFC), *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin*, CRITFC Technical Report, October 1994, https://critfc.org/reports/a-fish-consumption-survey-of-the-umatilla-nez-perce-yakama-and-warm-springs-tribes-of-the-columbia-river-basin/; see also U.S. Environmental Protection Agency, *Columbia River Basin State of the River Report for Toxics*, EPA Report 910-R-08-004, January 2009, https://www.epa.gov/sites/default/files/documents/columbia_state_of_the_river_report_jan2009.pdf.

[51] Dan Swinhoe, "Amazon to Expand Number of Data Centers Using Recycled Water to 120," *Data Center Dynamics*, September 19, 2025, https://www.datacenterdynamics.com/en/news/amazon-to-expand-number-of-data-centers-using-recycled-water-to-120/

[52] Open Compute Project. *Guidelines for Using Water-Based Transfer Fluids in Single-Phase Cold Plate-Based Liquid-Cooled Racks*. Open Compute Project Foundation. Accessed June 17, 2026. https://www.opencompute.org/documents/guidelines-for-using-water-based-transfer-fluids-in-single-phase-cold-plate-based-liquid-cooled-racks-final-pdf; U.S. Environmental Protection Agency (EPA). *Introduction to the National Pretreatment Program*. EPA-833-B-11-002. Washington, DC: U.S. Environmental Protection Agency, 2011. Accessed June 17, 2026. https://www.epa.gov/npdes/pretreatment-program

[53] Reemtsma, T., et al. "Polar Pollutants Entry into the Water Cycle by Municipal Wastewater." *Environmental Science & Technology* 40(17), 2006; Kiss, A., Fries, E. "Occurrence of Benzotriazoles in the Rivers Main, Hengstbach and Hegbach." *Environmental Science and Pollution Research* 16, 2009; and U.S. Environmental Protection Agency. *Per- and Polyfluoroalkyl Substances (PFAS) in Sewage Sludge (Biosolids).* Accessed June 18, 2026. https://www.epa.gov/biosolids/and-polyfluoroalkyl-substances-pfas-sewage-sludge.

[54] Tom Perkins, "Advocates Raise Alarm over PFAS Pollution from Datacenters amid AI Boom," *The Guardian*, October 4, 2025, https://www.theguardian.com/environment/2025/oct/04/pfas-pollution-data-centers-ai

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Oregon recognizes that data centers may pose wastewater treatment challenges.[55] ODEQ identified municipal pretreatment programs as essential for meeting water quality standards. Federal rules prohibit industrial users from introducing pollutants into POTW that disrupt operations. Because these programs effectively manage data center discharges, states should require sector-specific monitoring to ensure pollutants do not pass through, affect treatment, harm biosolids, or violate water quality standards.

Reported incidents and litigation cases illustrate how data-center water can stress municipal systems and interact with existing water-quality problems. In Georgia, a data-center project reportedly used nearly 30 million gallons of water before residents complained of low pressure.[56] Similarly, in Morrow County, Oregon, reports and lawsuits claim data-center cooling worsened nitrate-contaminated groundwater by extracting too much water, which reduced the watershed's dilution capacity.[57] In Cheyenne, Wyoming, a closed-loop "fill-and-flush" facility was found to be in significant noncompliance and the utility stopped accepting its wastewater, which was found to carry *Cupriavidus gilardii*, a metal-resistant bacterium that requires extensive cleaning. [58]

Stormwater and Spill Risks:
Data center facilities generate stormwater runoff and frequently include backup diesel generators, fuel storage tanks, and chemical containers, creating risks for unintentional releases to the environment. Such risks are elevated during storm events or equipment failures, potentially leading to localized contamination and further stressing municipal and regional water infrastructure. Data center companies must be transparent with local communities and their emergency response teams about their facility's hazardous material use and storage so that the community can prepare for worst-case scenarios.

Questions to Consider When Evaluating Data Center Impacts on Water Quality

Characterize the Discharge

- What is the total discharge volume, and how does it fluctuate over time (daily, seasonally, annually)?
- Is the discharge thermally elevated? What are the temperature ranges and peak values?
- What types of chemical contaminants are present in the discharge, and at what concentrations?

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[55] Mike Kucinski, *Water Quality and Permitting*, ODEQ (Mar. 27, 2026)(presentation to the OR Data Center Advisory Committee). https://www.oregon.gov/energy/Get-Involved/Pages/Oregon-Data-Center-Advisory-Committee.aspx.
[56] Arianna Skibell, "A Data Center Drained 30M Gallons of Water Unnoticed — Until Residents Complained About Low Water Pressure," *E&E News / Politico*, May 7, 2026.
[57] Sean Patrick Cooper, "'The Precedent Is Flint': How Oregon's Data Center Boom Is Supercharging a Water Crisis," *The Fern*, republishing *Rolling Stone*, Nov. 24, 2025; and Alex Baumhardt, "Amazon to Pay $20.5 Million Settlement Over Northeast Oregon Nitrate Pollution," *Oregon Capital Chronicle*, Mar. 31, 2026.
[58] https://www.tomshardware.com/tech-industry/data-centers/cheyenne-suspends-data-center-fill-and-flush-and-closed-loop-discharges-after-meta-contractor-contaminated-its-reuse-water-system

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- Do cooling towers utilize biocides, anti-scaling agents, or corrosion inhibitors? What are their potential impacts?
- Does the process of withdrawing, using, evaporating, and releasing water concentrate or amplify existing pollutants in the discharge?

Assess Municipal System Capacity

- Can the receiving wastewater treatment system effectively manage both the volume and chemical complexity of the discharge?
- How are storm events, system upsets, or equipment failures handled to prevent overflow or contamination?
- Has cumulative loading from all permitted dischargers, including data centers, been evaluated for overall impact?
- Do water releases contribute to overflow or runoff of other wastewaters during storm events, as documented at sites like The Dalles?
- Does the community have the capacity to provide oversight to this project?

Identify the Receiving Water Body

- Are there tribal fishing sites, critical habitats, or cold-water refuges downstream from the outfall?
- What chemicals are used in data center operations, and what is their presence in the discharge stream?
- How do low-flow conditions in the receiving water body affect dilution and potential impact of discharges?

Spill and Emergency Planning

- What chemicals and hazardous materials are stored on-site, in what quantities, and how close are they to surface water or storm drains?
- Does the spill response plan address each chemical specifically, and does it include notification protocols for affected communities, including tribal authorities?
- What chemicals are stored on-site under permit conditions, in what quantities, and how close are they to water bodies or storm drains?
- Is the spill response plan reviewed and updated as part of permitting, and does it include community and tribal notification protocols?

Permit Review

- Do NPDES permits contain specific limits or monitoring requirements for data center-related pollutants with “reasonable potential” to cause or contribute to violations of water quality standards?
- Do Water Pollution Control Facility (WPCF) permits for treated effluent to land consider how data center chemical constituents may affect soil health, agricultural productivity, or accumulate poorly degradable compounds that could later reach surface waters?

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Watershed and Cumulative Impacts

The siting and operation of data centers exert direct and indirect impacts on local watersheds, interconnected tributaries, aquifers, and water rights holders. Water withdrawals compete with instream flows necessary for salmon and other aquatic species, and even withdrawals miles from a river can dewater salmon streams. Low water conditions exacerbate water quality issues such as heat, dilution of pollutants, and flows for fish, while cumulative impacts from agricultural, municipal, and industrial users may compound these stresses. As multiple hyperscale facilities cluster in a region, shared water and power resources are stretched, raising concerns about equity, resource strain, and the potential for disproportionate effects in rural or underserved communities. These impacts are intertwined with energy consumption: U.S. data centers account for over 4% of national electricity use, with more than half sourced from fossil fuels, linking water stress to broader environmental burdens.[59] Already in 2024, Oregon data centers accounted for 11% of statewide electricity use, and are responsible for significant emissions increases.[60]

Air Quality Concerns

Beyond water impacts, data centers also contribute to air pollution, particularly through their reliance on backup energy sources and co-generation systems. These backup generators typically are gas-fired or diesel-fueled and operate less efficiently than utility-scale power plants, resulting in higher greenhouse gas and co-pollutant emissions per megawatt-hour.[61] For example, diesel-fueled generators release fine particulate matter (PM2.5) and nitrogen oxides (NOx), both of which are linked to respiratory illnesses and environmental impacts.[62] The cumulative effect of these emissions, especially as facilities cluster and scale up operations, can intensify local and regional air pollution burdens, further affecting ecosystem and community health.[63]

In Oregon, the clustering and scaling of data center facilities have intensified local air pollution concerns, especially during power outages when backup generators are turned

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[59] Guidi, Gianluca, *et al*, Environmental Burden of United States Data Centers in the Artificial Intelligence Era, Harvard T.H. Chan School of Public Health (Nov. 14, 2024). See also, Yanez-Barneuvo, Miguel, *Data Centers and Water Consumption*, Environmental and Energy Study Institute (EESI) (June 25, 2025). *See also*, Rieser, Jesse, *How data centers are deepening the water crisis*, Business Insider (June, 2025).

[60] https://www.oregonlive.com/silicon-forest/2024/10/oregons-data-centers-want-a-lot-more-electricity-whos-going-to-pay-it-could-be-you.html.

[61] Aman Azhar, *Off the Books: Maryland's Clean Energy Push Ignores Backup Generator Pollution*, Inside Climate News (July 16, 2025), https://insideclimatenews.org/news/16072025/maryland-clean-energy-goals-ignore-fossil-fuel-generator-pollution/. Env't Def. Fund, *Clearing the Air* (2025), https://turbinemap.edf.org/#clearing-the-air

[62] Walker, Carla, and Goldsmith, Ian, *From Energy Use to Air Quality, the Many Ways Data Centers Affect US Communities*, World Resources Institute (Feb. 17, 2026).

[63] *See, e.g.,* Env't Def. Fund, *Clearing the Air* (2025), https://turbinemap.edf.org/#clearing-the-air

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on together.[64] Recent modeling shows that a single hour of diesel generator operation in the Lower Umatilla Basin could produce roughly twice the pollution of all cars and trucks statewide for that hour.[65] Despite these risks, Oregon currently lacks statewide regulations specifically targeting diesel generators at data centers and does not track or model the potential air pollution releases during major outages. This regulatory gap stands in sharp contrast to Washington, where stricter controls and active monitoring are in place.

Transparency, Monitoring, and Policy Recommendations

Data center operations must be transparent, particularly sources of water, facility water demand, and water discharge practices, complicates efforts to assess and mitigate impacts.[66] Comprehensive, publicly accessible monitoring and reporting are essential for understanding the full extent of water quality and watershed effects. Policy makers should develop sector-specific enforceable regulatory frameworks, robust monitoring programs, and cumulative impact assessments to protect water resources and ecosystem health as the data center industry continues to expand.

Key Questions for Evaluating Data Center Impacts on Watersheds

- What are the projected impacts of data center operations on local watersheds, including water withdrawals, returns, and overall water use?
- Are adjacent and nearby water bodies being regularly monitored for changes in thermal regime, water quality, and aquatic health?
- What other industrial, agricultural, or municipal dischargers are permitted within the watershed, and have cumulative pollutant loads been thoroughly assessed?
- What monitoring and reporting requirements will be imposed, who will be responsible, and will the data be accessible to the public?
- How might discharge composition or volume change if the facility expands or modifies its operations over time?
- What are the current conditions of the watershed, including water withdrawals, returns, climate projections, population growth, and other competing water uses?
- How will data center operations affect water rights holders, including municipal, tribal, and treaty-reserved rights? What are the implications for existing and reserved tribal and treaty water rights, and how will these be protected?
- How will data center operations affect instream flows necessary for aquatic species and ecosystem health?

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[64] Ehrlich, April, *Why data centers pose an outsized threat to Eastern Oregon's air quality*, Oregon Public Broadcasting (July 22, 2026)("We found the company has amassed enough diesel generators to cloud the nearby cluster of small, rural towns along the Columbia River with smog. For each hour that an outage lasts, they would emit about twice as much pollution as all of the exhaust from cars and trucks on Oregon's roads over the same hour.")

[65] Ehrlich, April, *How we reported the story about emissions from data center generators*, Oregon Public Broadcasting (July 22, 2026).

[66] Washburn, Lindsey, *et al*, *Endless Thirst: Addressing Data Centers' Soaring Water Demands at the Local Level*, GovAI Coalition (May 27, 2025).

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- Will there be changes to water temperature or water quality standards, and how will these be addressed?
- Are there opportunities for watershed enhancement or restoration as part of the project?
- What is the risk of introducing volatile organic compounds (VOCs), nitrous oxides, sulfur dioxides, or particulate matter from on-site power generation into the air and waterways, and is there a mitigation plan in place?

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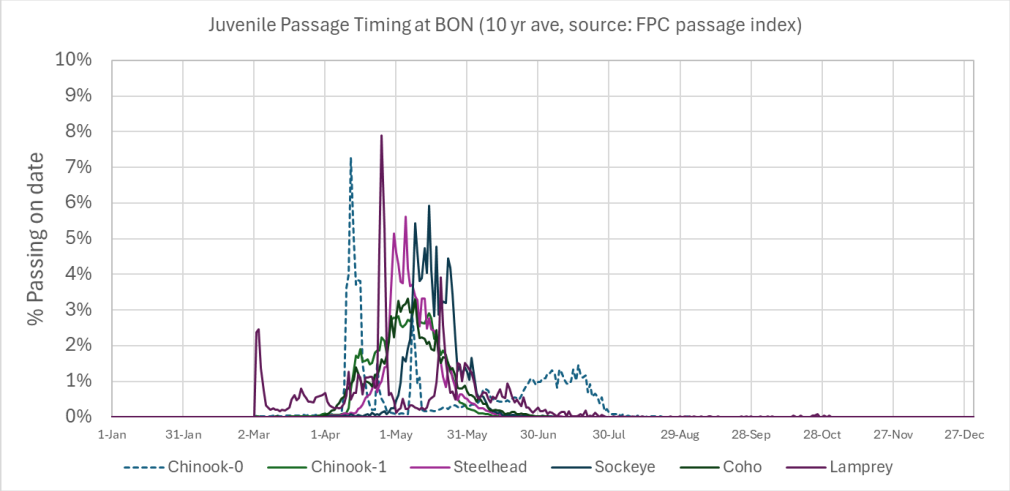
Columbia River System Operations for Fish

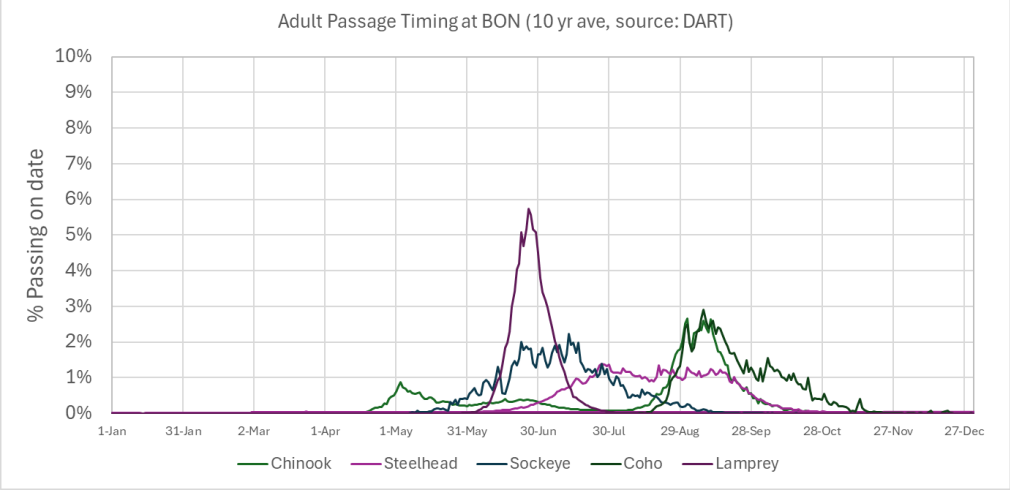
Columbia River Inter-Tribal Fish Commission

Columbia River hydropower operations for fish have been negotiated, litigated, and fine-tuned over decades. The following gives a general introduction to the variables at play and the current operations and constraints.

Salmonid and Lamprey Migration Timing

Below are 10-year averages for the main groups of salmonids, plus lamprey. As you can see, November through February is the quietest period for passage and migration, but spawning continues into December (for example: chum and Chinook spawning below Bonneville Dam). The absence of smolt numbers from November through February reflects a lack of sampling in addition to low migration numbers, as sampling windows were built around historic timing.





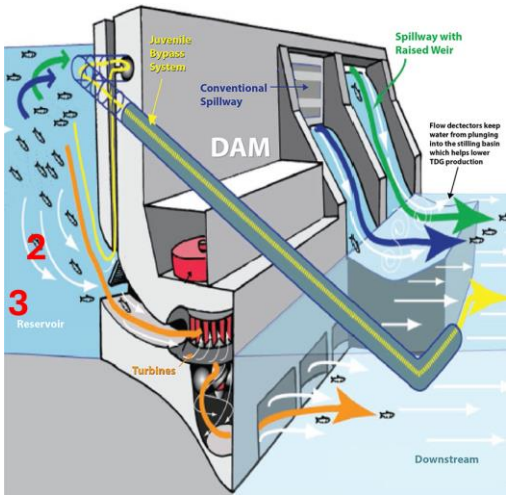
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Hydropower Operations for Fish

Hydropower operations for fish protections are set annually and prescribed in the Corps of Engineer's Fish Passage Plan (FPP).[1] As noted there, the 2026 spill operations were amended by Court Order by the District Court of Oregon in the *NWF v. NMFS*[2] ongoing litigation, and those changes have been incorporated into the 2026 FPP. Perusing the FPP, it is clear that Columbia River System (CRS) operations are complicated, involve multiple competing variables, and have been carefully set to maximize benefits for both fish and hydropower.

Spill for juvenile fish passage provides the safest downstream migration route past the dams but also introduces the greatest constraint on turbine energy production. The figure below shows the ways that young salmon that are migrating to the ocean can get past a dam. The first two involve spilling the fish over the dam. The **green arrow** shows spill over a special weir at the top of the water column—this is the highest survival route. The **blue arrow** shows how water moves through the spillway—this route has high survival, but the fish must dive to get past the dam.

The other two options show when fish must dive deeper to go through the powerhouse, resulting in a powerhouse encounter. The **yellow arrow** shows fish diverted away from the turbine by a screen system that carries the fish through tunnels and pipes through the dam; direct survival through the juvenile bypass system is not as good as spill. The **orange arrow** shows fish passing though the turbines which produces the lowest survival.



[1] The 2026 FPP is available at https://public.crohms.org/tmt/documents/fpp/2026/.
[2] *National Wildlife Federation v. National Marine Fisheries Service*, No. 3:01-cv-00640 (D. Or. Feb 25, 2026 / Amended March 2, 2026).

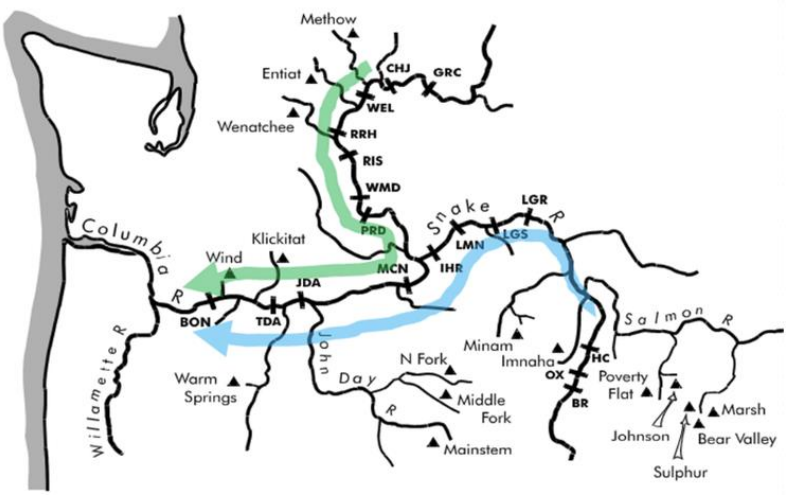
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Passage through the turbines is hazardous for fish. Pressure changes can explode the swim bladder; injuries from turbine blade strike or other structures, shear injuries, and disorientation which make the fish more susceptible to predators below each dam or lead to other delayed mortality. Bypass passage has greater survival than via turbines, but still less than spill. And for fish that survive the turbines or bypass systems, cumulative stress from the experience can lead to lower lifecycle survival rates relative to fish that avoid powerhouse passage via spillways.

Survival varies by dam and species, but roughly, survival via each avenue is as follows:[3]

- Spillway: with weir, 96-100%; without, 92-100%
- Bypass: 85-95%
- Turbine: 65-90%

These numbers represent direct survival only and do not account for additional delayed mortality. Also, while these numbers may not appear to vary much, they compound with multiple dam passages. When spill is curtailed, survival is reduced to between 65% (low end turbine) and 95% (high end bypass); the compounding effects are devastating for fish that pass eight or nine dams. The map below shows these migration routes for Columbia and Snake River salmon and how many dams they must pass.



In addition, reductions to or elimination of fish-related reservoir draft limits, ramping rates, and changes in reservoir elevations slow the migration of fish traveling out to sea. Powerhouse passage – whether through the turbines or the bypasses -- also exacerbates the cumulative effects of passing multiple dams. The cumulative and delayed lifecycle

[3] See, e.g., PNNL, Passage and survival of juvenile salmonid smolts through dams in the Columbia and Snake Rivers, 2010-2018; https://www.pnnl.gov/publications/passage-and-survival-juvenile-salmonid-smolts-through-dams-columbia-and-snake-rivers

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impacts of navigating multiple dams and reservoirs are significant and harmful even under more protective dam operations, and they skyrocket when those protective operations are removed.

Spring spill operations for juvenile migration are scheduled early- to mid-April thru mid-June, with slight variations in start and end dates between the four lower Snake River projects and the four lower Columbia River projects. Summer spill operations pick up where spring spill ends and continues through August 31 under the Court Order. In short, there is some sort of juvenile spill at all eight dams from April through the end of August.

The levels or amount of juvenile spill are set by dam and season. Under the Court Order, 2026 spring spill is prescribed in terms of total dissolved gas (TDG) limits and requires that water be spilt until the gas level in the river below the dam reaches 125% TDG, 24 hours/ day (note, the Dalles and Bonneville dams having slight variations to how this is applied). Summer spill is prescribed as flow targets described in terms of either a set kcfs amount or a percent of flow that must be spilled. These are also 24 hours/ day under current Court Ordered operations.

In early spring (March through early April) and fall (September through mid-November), surface spill operations are required. These spills are significantly less in volume and provide passage for early/late migrants, adult fallbacks, and attraction flows for migrating adults. This leaves a spill shutdown period between November 16 and the last day of February.

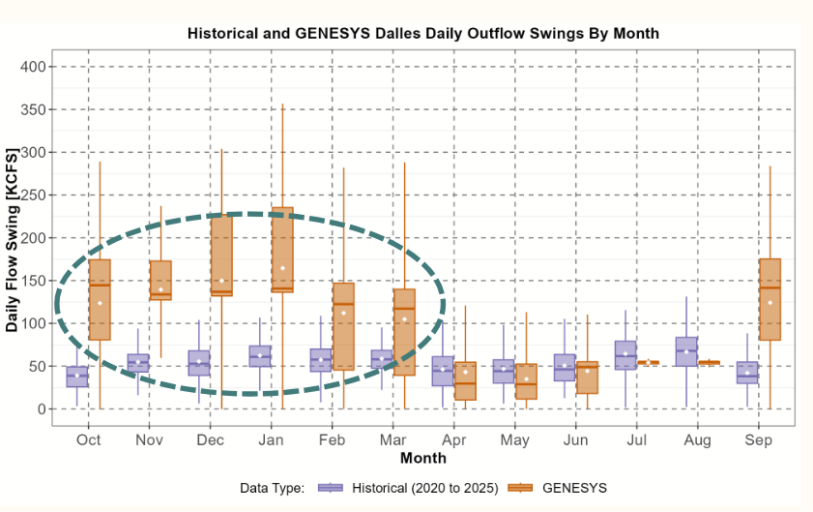
Notably, there is a lot more involved with hydro-operations related to fish than just spill. As the FPP signals, there are turbine efficiency targets, winter flow targets to keep redds watered, scheduled and emergency maintenance needs that require operational modifications, abnormal river conditions that impair normal spill operations, barging and navigational considerations, and more. The CRS projects are also operated within minimum pool elevation and fluctuation constraints to support downstream passage, constraints that also limit the volume of usable storage available to support system 'flexibility'. Ongoing operations are adaptively managed through the regional Technical Management Team (TMT) to balance biological needs with system operations.

Constraints for Fall/Winter Hydro Flexibility - Daily Peaking

Regional energy planners have been looking more toward the Columbia River System as a source for addressing regional winter energy demand and reliability needs. For instance, as part of the planning for the Northwest Power and Conservation Council Ninth Power

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Plan, Council staff presented information indicating that the Council's model analysis sees greater hydro flexibility in the fall/winter (~ Oct thru ~March) than currently utilized and provided a Recommendation that the region explore opportunities to leverage this potential hydro system flexibility to a greater extent.[4] This modeled flexibility is depicted in the Council's slide below. Notably, the slide does not suggest additional flow flexibility for the months with juvenile spill operations as those constraints clearly disallow large flow fluctuations.



As discussed below, the potential for hydro flexibility in the fall/winter as shown in the Council analysis is unrealistic and raises numerous resource management concerns that would need to be carefully addressed before any winter peaking operation could occur. *Importantly, if additional peak energy was regularly available from the hydrosystem, Bonneville would already be using it*.

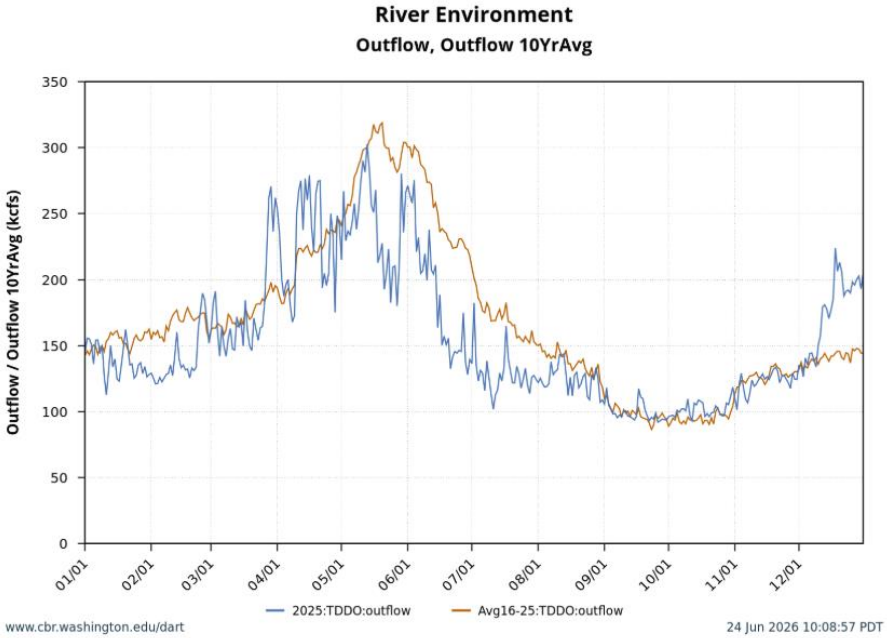
Hydrologic/Operational Feasibility.

While large swings (e.g. 200 kcfs) like those shown by the Council are possible, they are logistically difficult to achieve on a regular basis due to the balance of flow required, need for coordination across projects, and other operational constraints and considerations (e.g., navigation needs). Moreover, a 200+ kcfs swing usually requires a river flow of about 350 kcfs, which is not likely during the fall and winter months. The Council slide showed GENESYS modeled swings at The Dalles Dam ranging between 100 and 250 kcfs for fall and early winter months or 2-4 times greater than what is evident in historical data. For instance, outflows at The Dalles Dam typically average between around 100 to 150 kcfs

[4] May 13, 2026, Power Plan Work Session slides, https://www.nwcouncil.org/fs/19872/2026_05_4.pdf.

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during this seen in USACE project data obtained from University of Washington-Columbia Basin Research's Data Access in Real Time (DART) site.[5]



Also, all four lower Columbia projects need to work in unison for peaking outflow operations to work. Specific restrictions at some dams many times of the season (e.g., chum operations, discussed below) would make swings like this impossible.

Biological Concerns.

Peaking operations should not be prescribed for September and October. In 2025, these months were characterized by record warm waters and significant adult salmon migration delay and mortality. Flexing hydro operations at this time would need annual and real-time consideration of river conditions to ensure the added stress of wide flow and velocity fluctuations is not imposed on fish that are already stressed and living at their physiological limits.

Peaking operations in November and December would likely impact spawning endangered chum species and make it harder for tailrace targets to be maintained below Bonneville Dam once spawning starts. Tailrace targets are set water levels intended to keep spawning at river elevations below a water level that can be maintained throughout the winter to keep redds watered.

[5] Available at https://www.cbr.washington.edu/dart (accessed June 24, 2026).

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Implementing peaking operations of any magnitude during all winter months may also expose redds during the low-flow end of the daily cycle. The upswings are also likely to trigger substantial activity in resident fish that are otherwise attempting to survive the winter months in a quiescent state (e.g., white sturgeon). Moreover, introducing new, more extreme hydropeaking in winter months is likely to create non-trivial impacts on the overall river ecosystem, food webs, and benthic communities that are not well understood.

Additional Concerns.

Swings in dam flows could affect tribal treaty fisheries, impose serious safety issues, and affect fishers' gear and overall fishing effectiveness. We currently use protocols called System Operations Requests to protect the fishery in winter months, holding pools level to manage, for example, the September gillnet fishery and winter sturgeon fishery. Hydro flexibility operations would need to be limited during tribal fisheries.

System Reliability & Emergency Protocols

The Columbia River System is also being looked toward more for ability to assist with occasional and multi-day regional peak demand needs. This would be the situation where, for example, a regional heat dome or cold snap arises that leads to increased energy demand for several hours or days, threatening regional reliability.

The Technical Management Team has developed Emergency Protocols to guide operational adjustments when faced with an emergency situation, including a Generation Emergency which is defined as "the potential for or actual insufficiency of electrical generation to satisfy electrical demand or load." [6] The Protocols include an Action Plan for such Generation Emergency which identifies pre-emptive actions and emergency actions that will be taken consistently with the Protocol to protect fish operations. Notably, the Protocol states, "Emergency actions will not be taken in place of long-term investments necessary to allow full uninterrupted implementation of the planned reservoir and dam operations while maintaining other project purposes."[7]

Per the Power System [Generation] Emergency Action Plan:

> If hydropower generation must be adjusted to support power system reliability, and this adjustment will alter planned fish operations specified in applicable

[6] Technical Management Team, Emergency Protocols [for the] Columbia River System, December 5, 2025; attached as Appx.1 of the Water Management Plan; https://public.crohms.org/tmt/documents/wmp/2026/Appendix/Appendix_1_Emergency_Protocols_20251202.pdf

[7] *Id.* at 2.

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biological opinions (and other guiding operative documents), Bonneville will attempt to implement the actions in the pre-emptive actions list below, where practicable.

Included in the pre-emptive actions are the following actions, which are in no specific order and not exclusive of additional actions to address the reliability issue before turning to "Contingency Actions", which are pre-determined priorities for altering fish operations, listed by date and tier for implementation.

Pre-emptive Actions (not in priority order)

- Purchase Energy and/or reserves at prices up to the applicable FERC WECC price cap.
- Request that Corps and Reclamation return all possible units to service by canceling or postponing scheduled generator or equipment outages (e.g., makes all units available).
- Request the transmission dispatcher consider adjusting transmission system maintenance or other possible actions that would allow increases or decreases in CRS generation as appropriate.
- Put into service (online) all possible generators (e.g., Grand Coulee pump generators) while preserving sufficient energy storage to maintain reserve capability in subsequent hours.
- Reshape flows within objectives at specific projects to meet immediate generation needs e.g., spill upstream projects to position water downstream.
- Cut any interruptible power commitments.
- Request adjustment of pumping schedule at Banks Lake.
- Request variance from non-power operational objectives or limits at CRS hydro projects (e.g., forebay draft limits, tailwater rate of change, recreation, irrigation, Treaty fishing, etc.)
- Reduce the amount of balancing reserves provided by the CRS to the minimum amount necessary for power system stability and reliability.
- Acquire any resources made available through the issuance of a "EEA Watch".
- After exhausting all available reserve sharing opportunities ask the transmission dispatcher to request the Reliability Coordinator to declare an Energy Emergency ALERT 1 when there is concern about sustaining required operating reserves.

Of note for this conversation is the, "Cut any interruptible power commitment" action. With data centers forecast to exponentially increase power demand in the region, retaining the ability to interrupt some or all of that power in a regional power emergency cannot be overstated. Unfortunately, BPA currently only has the authority to cut its power commitment to a direct customer with interpretability in its contract, e.g., a direct service

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data center that has agreed to interruptible power service. A mechanism is needed where BPA, as the regional power authority, has the ability to call for the reduction in data center power service when needed to address regional reliability, even where that data center is not directly served by the BPA.

Energy emergencies can last for hours up to days and weeks. In 2001, fish protections were shut off at the federal dams for weeks on end, millions of migrating salmon and steelhead were killed. For example, only 6% of juvenile steelhead survived their in-river migration from Lower Granite Dam on the Snake River to Bonneville Dam; in most years the survival rate is 40% to 70%.

There are also minor fish operations variances to accommodate short-term problems. The federal dam operators adjusted fish spill operations for 4,269 hours between 2020 and 2025 for various reliability problems, including human and program error, maintenance, navigation, and debris issues, and transmission reliability reasons. Each of these variances represent another transgression against fish survival, further eroding survival through the hydropower system. Transmission reliability can relate to the need to adjust electricity generation to maintain voltage stability or reactive power on regional transmission lines or transmission lines to California.