
INDEPENDENT ANALYSIS

Where the Instrument Stops

Virginia's Groundwater Ceiling, Its Grandfathered
Rivers, and the Load Outside Both

An Executive Brief Across Three Volumes

RECORD

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Virginia's Groundwater Ceiling, Its Grandfathered Rivers, and the Load Outside Both. An Executive Brief Across Three Volumes.

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Summary

Virginia regulates groundwater east of a highway. The Department of Environmental Quality wrote down why, in the study the General Assembly ordered: "The I-95 corridor runs along the east side of the Fall Zone, so that a strip of VCP sediments lies between" the road and the geological contact, and "[f]or the purposes of the SJ 25 groundwater study and report, this strip is disregarded, and I-95 is treated as the approximate western edge of the VCP aquifer system."^[1]

The strip was disregarded for a study. The line was not. The Commonwealth drew a regulatory boundary at the same road in 9VAC25-600-20, and inside that boundary it regulates groundwater by quantity and rigorously. Outside it, the statute excludes "the withdrawal of ground water in any area not declared a ground water management area," with no volume qualifier, no use qualifier and no aquifer qualifier.^[2]

Three deposited volumes work this record. *The Aquifer Says No* reads the SJ 25 report itself. *Two Systems, One Drought* takes the two water regimes and the energy buildout's actual demand. *A Line Drawn on a Highway* takes the boundary, the rivers beyond it, and the load the groundwater regime does not reach. This brief carries the four findings that none of them makes alone, and routes the reader to the volume that answers a given question.

Finding 1. Virginia's water debate has one shared document and almost no shared evidence. Across 726 entity-bearing claims in the three volumes, four subjects carrying twenty or more claims are engaged near-evenly by all three: SJ 25 at 40 claims and an evenness of 0.942 on a scale where 1.000 is perfectly even, Richmond at 25 and 0.908, Franklin at 24 and 0.873, and the Eastern Shore at 20 and 0.853. Three of the four are places. SJ 25 is the only document. Every institution of comparable weight is owned outright by one volume: the Hampton Roads Sanitation District carries 43 claims, all in *Two Systems* and none anywhere else, and Loudoun Water 29, Stafford 24, King George 23 and Prince William Water 15, every one of them western and none eastern.^[3]

Finding 2. The Commonwealth measured the aquifer where the load is not, with a model that stops before the load begins, inside a boundary drawn on a road. DEQ tested nine sites and none passed at three million gallons a day.^[4] Of 286 inventoried data center facilities, 257 sit outside every declared groundwater management area, and in the northern crescent the nearest facility to Interstate 95 is 12.7 kilometres away.^[5] The flow model that produced the eastern numbers runs "from Stafford, Virginia, south," and DEQ states that the area north of Stafford "is outside the model domain boundary due to the incomplete characterization of this geologically complex area along the Fall Zone."^[6]

Finding 3. The grandfathering asymmetry runs the wrong way on every axis: age, size, and who pays. Fairfax Water's two treatment plants withdrew 94.6 and 69.4 million gallons a day in 2024, a combined 164.0, both unpermitted under an exclusion for withdrawals in existence on 1 July

1989.^[7] Caroline County holds a permit for 9.0 million gallons a day from the Rappahannock, reached by roughly thirty-five miles of pipe across a watershed divide, carrying a fifteen-year term, no extension, and curtailment to 7.0 and then 6.0 on declared drought.^[8] The county went to the river because DEQ's model says the aquifer beneath it yields 60,000 gallons a day.^[9]

Finding 4. The instrument that reports all of this is not stable between editions. Between DEQ's October 2024 and December 2025 annual reports, Prince William County's reported surface water withdrawal falls from 69.74 to 2.15 million gallons a day, a drop of 97 percent accounted for almost entirely by one treatment plant being relabelled into Fairfax.^[10] Fairfax County's own figure falls as well, from 86.86 to 70.08, because the Potomac plant leaves the locality accounting while the Occoquan plant arrives.^[11] Corbalis at 94.6 million gallons a day, the second largest non-power withdrawal in the Commonwealth, appears in two tables of the December 2025 report and in no locality's row of a third.^[12]

The eastern ceiling is durable and citable from a document with the Commonwealth's seal on it. The western and surface-water half is where the load actually sits, and it is the half the state's own instrument reports least reliably.

1. What the study establishes

Senate Joint Resolution 25 passed in 2024 and named data centers among its reasons, directing DEQ to "evaluate potential future impacts to the groundwater supply as a result of increasing groundwater withdrawals from newer industries such as data centers."^[13] The report was due the first day of the 2026 session. DEQ submitted it to the Secretary of Natural and Historic Resources in December 2025, and it became public in late July 2026, within days of a public letter from Friends of the Rappahannock and allied organisations asking the Governor to release it.^[14] The 2026 session therefore legislated on data center water reporting without the Commonwealth's own groundwater verdict in front of it.

DEQ engaged Aquaveo, LLC to run its permitting evaluation against nine hypothetical withdrawals of three million gallons a day, that figure being "the upper end of published estimates of water usage by data centers that rely on evaporative cooling technology."^[15] Eight sites were the centroids of the agency's groundwater budget regions. The ninth, Surprise Hill in Northumberland County near Reedville, was a deliberate best case, where the Potomac aquifer is roughly 1,800 feet thick. All nine failed. The agency then asked how much would pass.

Location tested	Locality	Maximum passing, gal/day
Surprise Hill, best case	Northumberland	360,000
Northern Neck centroid	Richmond County	180,000
Middle Peninsula centroid	King and Queen	180,000
Eastern Shore centroid	Accomack	180,000
York-James centroid	James City	120,000
Southeast Virginia centroid	Chesapeake	120,000
Northwest Coastal Plain centroid	Caroline	60,000
Middle James centroid	Henrico	under 30,000
Chowan centroid	Sussex	under 30,000

The best result anywhere was 360,000 gallons a day, against DEQ's own benchmark of roughly 300,000 for a typical hundred-megawatt hyperscale campus.^[16] One site in nine clears one campus, and the report says of that site that its infrastructure "would not necessarily attract or support data-center or other large scale development."^[17] Splitting the Surprise Hill withdrawal across three wells a mile apart returned an identical result, which closes the obvious engineering answer.^[18] At the

Henrico and Sussex centroids the model cells were already critical under the baseline, so no withdrawal passed at any volume the analysis measured, and DEQ found that moving the test sites to nearby non-critical cells would not substantially raise the ceiling.^[19]

Two qualifications belong on the table before anyone quotes it. Each simulation added one hypothetical well field to the fully permitted baseline, and the report states that "the analysis did not simulate the combined effects of multiple added withdrawals."^[20] These are ceilings for a lone applicant, not an allocation the region can issue nine times.

The second is that the finding is not about data centers. DEQ's synthesis sentence is that "it appears unlikely that a data center with evaporative cooling technology (or any comparable water user) would find a reliable, sufficient groundwater supply anywhere in the VCP."^[21] The parenthetical is the operative clause. Data centers prompted the question, and the ceiling binds a bottling plant, a fabrication facility, an irrigation district or a municipal wellfield on the same terms.

What the study establishes is a resource ceiling for one aquifer system, measured one applicant at a time, inside a boundary the agency drew on a highway for convenience and said so.

2. What follows where the model reaches

Inside the model's reach the study becomes a policy document. DEQ returned twelve recommendations for the 2027 session, organised around eight problem areas.^[22] Three of them matter more than the rest to anyone weighing a proposal.

Recommendation 2 is the categorical bar nobody has named as one. It would let DEQ deny a groundwater permit, or reduce the volume, whenever alternative sources such as surface water or reuse are "reasonably available."^[23] Inside a public service area an alternative is nearly always reasonably available. The recommendation reads as a discretionary tool and functions as a prohibition on industrial groundwater self-supply in served territory.

Recommendation 5 moves the water question to the front of the land-use sequence. Today § 15.2-2223 lists groundwater-availability measures among the things a comprehensive plan "may include." Recommendation 5 would require plans inside groundwater management areas to limit planned growth to the groundwater available where no other supply is feasible.^[24] Virginia courts read § 15.2-2232 to require that major facilities be substantially in accord with the plan, so a mandate at that layer pre-answers a category of siting questions before an applicant is in the room. Its reach depends entirely on drafting. "If no other water supply is feasible" could be read to exempt any parcel a utility will serve, which returns the question to the service agreements. It binds planned growth, not existing entitlements.

Recommendation 12 prices the program. Groundwater permit fees are capped by statute at \$9,000 and produced \$381,000 in FY 2025 against a program costing roughly \$4 million, while two compliance staff inspect 484 permitted facilities statewide against DEQ's own 20-percent-per-year floor.^[25] The four appropriations recommendations total \$1,020,000 in FY 2027.^[26]

The allocation fight opened on 20 August 2026, when the State Water Commission took the report. Presenting Recommendation 1, DEQ's Director put on the broadcast record why a priority for human consumption does not survive contact with the queue: "how we do that is very difficult as we permit things on a first come, first served basis. So we won't know, say an industrial user comes in, and then next month, after we issue the permit, a human consumption need comes in."^[27] The statutory preference exists. Nothing lets the agency hold a place in line for it. The same hearing produced the first published levelized cost comparison of Virginia's three engineered alternatives, as presented, per thousand gallons over twenty-five years: wastewater reuse \$3.32, aquifer recharge through SWIFT \$4.98, desalination \$6.96. The underlying analysis has not been published.^[28]

The agency's position on SWIFT is routinely overstated in both directions and is worth stating precisely. The Hampton Roads Sanitation District's programme is designed to inject roughly 50 million gallons a day at full scale, and DEQ will credit measured recharge in permitting decisions. It will not model projected benefits into the fifty-year simulations its permitting machinery runs on, and says a credible model needs about a decade of operating data.^[29] A county told that SWIFT will

make room for new withdrawals should note that the agency running the model does not yet believe it.

3. What is absent where it stops

The study's own boundary is the beginning of the second half of the record, and it is the half this brief exists to put beside the first.

The model stops inside the area the Commonwealth regulates

The Fall Line boundary is a documented design decision. The other limit is not, and it has been little noticed. DEQ's report states that the flow model's domain "encompasses an area from Stafford, Virginia, south to the adjacent Coastal Plain of North Carolina, and from the Fall Zone to the Eastern Shore of Virginia," and that "[t]he VCP area north of Stafford, Virginia, is outside the model domain boundary due to the incomplete characterization of this geologically complex area along the Fall Zone."^[30]

The Eastern Virginia Groundwater Management Area includes the portions of Fairfax, Prince William, Stafford, Spotsylvania and Caroline counties east of Interstate 95, and King George County entire. The model begins at Stafford. Everything the Commonwealth regulates north of Stafford sits outside the instrument it regulates with, and the agency gives the reason.

DEQ's own remedy is to convert the gap into a prohibition. The Director's slides for the August hearing carry Recommendation 1(d): "[p]rohibit DEQ from issuing permits for new significant withdrawals in portions of GWMA's located outside the extent of the applicable GW flow model."^[31]

The load is not inside the boundary at all

Of 286 geolocated facilities in the statewide inventory, 29 sit inside a declared groundwater management area and 257 sit outside, or 89.9 percent.^[32] Twenty-one facilities in the eight counties the regulation splits lie within three kilometres of the interstate, close enough that their classification turns on a road centreline rather than on anything hydrogeologic; counting all of them inside gives 84.6 percent outside and counting all of them outside gives 92.0 percent. The defensible statement is 84.6 to 92.0 percent, best estimate 89.9.

That is a facility count and not a measure of capacity, and it is a floor rather than an estimate: the inventory holds 286 named facilities against a summary count exceeding 450 in Loudoun alone, and that undercount falls in a county entirely outside every declared area.

In the northern crescent no marginal case arises. Every one of the 210 facilities in Loudoun, Prince William, Fairfax, Fauquier and Culpeper lies west of Interstate 95 or north of the point at which the highway leaves Virginia. The nearest sits 12.65 kilometres from the road, in Fairfax; in Prince William 20.69, in Fauquier 24.82, in Loudoun 30.81 and in Culpeper 45.44.^[33] All 121 Loudoun facilities lie north of latitude 38.7936, where Interstate 95 ends at the District of Columbia line. The county holding 42 percent of the inventory sits beyond the northern end of the line the regulation divides the state with. Figure 1 plots the inventory against the declared areas.

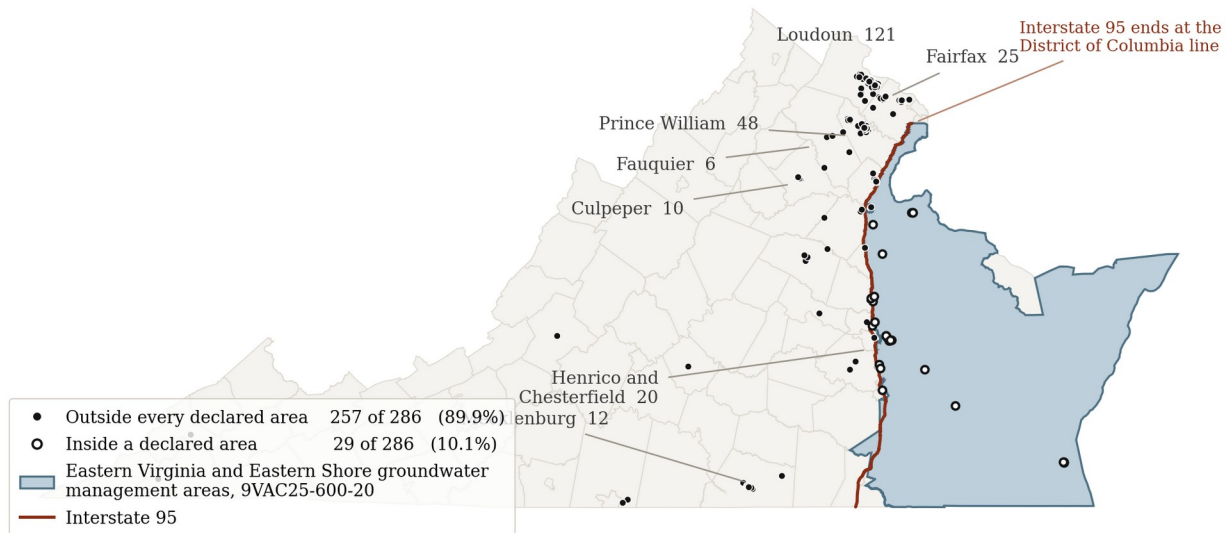


Figure 1. Virginia's 286 inventoried data center facilities against the declared groundwater management areas of 9VAC25-600-20. 257 of 286, or 89.9 percent, lie outside every declared area; the defensible range is 84.6 to 92.0 percent and the figure is a floor, because the inventory undercounts Loudoun. Interstate 95 is drawn to its full Virginia extent and ends at the District of Columbia line. Author's computation; see note 5.

And the line is not the geology

No Virginia agency publishes the Fall Line as a line feature. Derived from the 1993 state geologic map at 1:500,000, the western edge of the mapped Coastal Plain through the Fredericksburg corridor resolves into a scatter of fifty-five separate traces spread across roughly twenty-five kilometres of longitude, the ragged updip margin of a wedge of sediment thinning to nothing over crystalline and Triassic basement. Interstate 95 runs through the middle of that scatter and crosses it at least six times.^[34]

The count is deliberately conservative. Thirteen intersections were computed, seventeen excluding Quaternary cover; four bound excursions inside about twice the source map's positional precision and two further pairs would merge under a small shift in the traced contact. Six survive any reasonable allowance, which is why the published figure is at least six and not a count.

At the latitude of the interstate's own Centreport Parkway interchange the contact runs through an industrial park mapped 71 percent Potomac Formation and 29 percent quartz diorite gneiss.^[35] Figure 2 shows the contact and the road through that corridor.

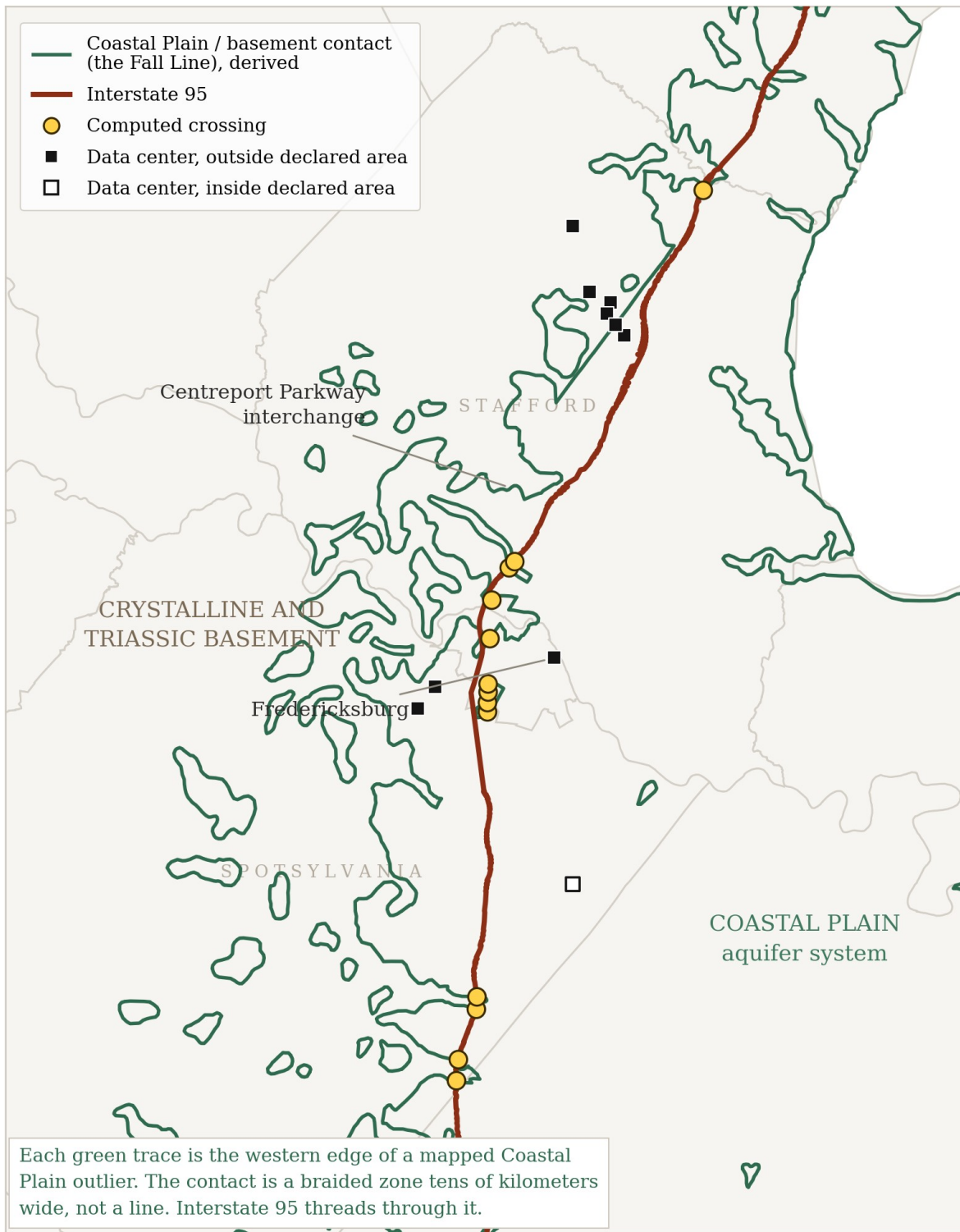


Figure 2. The Coastal Plain contact and Interstate 95 through the Fredericksburg corridor. The contact resolves into fifty-five separate traces across roughly twenty-five kilometres of longitude, a braided zone rather than a line. Derived from the 1993 Geologic Map of Virginia at 1:500,000; no Virginia agency publishes the Fall Line as a line feature. Thirteen crossings were computed and four bound excursions at or below the source map's positional precision, so the figure reported is at least six rather than a count. Reproduced at reduced scale from *A Line Drawn on a Highway*. Author's computation; see note 34.

The surface-water regime is grandfathered out of view

The half of Virginia's water the buildout actually draws on is the half the permitting programme mostly does not see. Section 9VAC25-210-310 A 1 excludes any surface water withdrawal in

existence on 1 July 1989. In 2024 that exclusion covered 81 percent of reported surface water withdrawals by volume, 916.16 million gallons a day, and fourteen of the twenty largest reported withdrawals in the Commonwealth. The year before it was 76 percent, 857.9 million gallons a day, and twelve of twenty.^[36] Roughly one gallon in five of non-power surface withdrawal moves through a Virginia Water Protection permit.

Fairfax Water operates the Corbalis plant on the Potomac at Herndon and the Griffith plant on the Occoquan Reservoir at Lorton. Calendar 2024 withdrawals were 94.6 and 69.4 million gallons a day, a combined 164.0 by the author's addition; DEQ reports the two plants separately and publishes no utility total.^[37] Neither intake holds a withdrawal permit, and none is required.^[38] The system serves roughly 2.2 million people.

Set that against the county at the other end of the same corridor. DEQ issued Virginia Water Protection Individual Permit 20-0514 to the Caroline County Department of Public Utilities on 26 November 2025, expiring 25 November 2040. It authorises a maximum of 9.0 million gallons a day from the Rappahannock, reached by roughly thirty-five miles of pipe across a watershed divide, against physical works engineered and modelled at 13.9. Actual withdrawal is zero, because nothing is built. Industrial cooling was withdrawn from the application in December 2024 and then excluded by express term. The permit curtails to 7.0 million gallons a day on drought warning and 6.0 on drought emergency, with weekly reporting throughout, runs fifteen years, and cannot be extended.

[39]

A utility serving 2.2 million people draws 164.0 million gallons a day from two rivers at no permit cost, outside any cumulative evaluation, and was never required to ask. A county of thirty thousand crossed a watershed divide and acquired, in exchange, the only enforceable quantitative ceiling anywhere in the corridor. Neither party is doing anything improper, and Fairfax Water holds an exclusion the regulation grants it. The observation is about what that exclusion distributes: the oldest and largest withdrawals were exempted, and the newest and smallest are paying to build alternatives and accepting curtailment terms to do it. Figure 3 sets the twenty largest reported withdrawals of 2024 against their permit status.

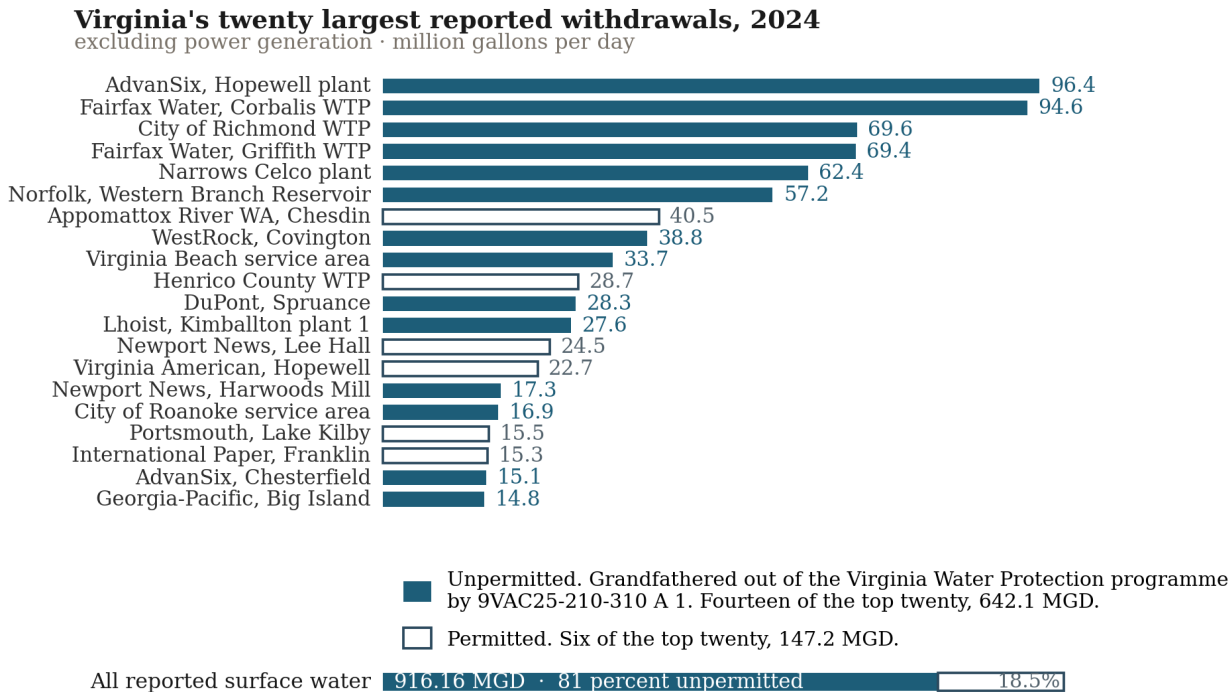


Figure 3. Virginia's twenty largest reported non-power withdrawals for calendar year 2024, permitted against grandfathered. Fourteen of the twenty are unpermitted, 642.1 of 789.3 million gallons a day, against 81 percent across all reported surface water. No map is drawn because DEQ's Table 20 carries no coordinates and names no water body; the table reports at the facility and at the locality, and nowhere at the river. DEQ, Annual Water Resources Report, December 2025, Appendix 1, Table 20, p. 52, and Table 2, p. 24; see notes 36 and 37.

The instrument that reports it moves

Everything above rests on DEQ's *Annual Water Resources Report*, and the report is not stable across editions. Table 21 gives each locality's reported withdrawal. For calendar 2023 it carries Prince William County at 69.74 million gallons a day of surface water. For calendar 2024 it carries 2.15. Nothing changed on the ground. Fairfax Water's Griffith plant is attributed to Prince William County in the earlier edition and to Fairfax in the later one, and the 67.9 million gallons a day it withdrew in 2023 accounts for essentially the whole of the fall.^[40]

Fairfax County moves in the same operation and in the same direction, which is the part that does not follow. It gains Griffith at 69.4 and still falls, from 86.86 to 70.08, because Corbalis leaves. Corbalis withdrew 94.6 million gallons a day in 2024 and appears in Table 5 and Table 20 of the December 2025 report. It appears in no locality's row of Table 21 in the same document. Both editions reconcile to their own statewide totals, so this is not a rounding artefact.^[41]

Three smaller changes point the same way. City of Richmond WTP is marked permitted in the calendar 2023 Table 20 and unpermitted in the calendar 2024 Table 20. The manufacturing category is renamed Industrial, with three facilities renamed under it. The five-year average is redefined to exclude the current year.^[42]

The consequence is procedural. Any figure from this report needs its edition and calendar year attached, and a comparison across editions has to establish that the two rows describe the same thing before it can describe a trend. That standard is not hypothetical: the corpus this brief draws on carried two calendar years of the Fairfax withdrawal as one figure set until 26 August 2026.^[43]

4. Where to read further

The three volumes are deposited and citable. This table routes a question to the volume that answers it.

Question	Volume	Section
What did SJ 25 actually find, and what did DEQ recommend	<i>The Aquifer Says No</i>	§3, §5
What the nine-site test means county by county	<i>The Aquifer Says No</i>	§4
The comprehensive-plan lever and its drafting risks	<i>The Aquifer Says No</i>	§6
Virginia's two water regimes and why nothing sums them	<i>Two Systems, One Drought</i>	Intro, §2
The 2026 drought and the record it set	<i>Two Systems, One Drought</i>	§4
The eastern migration to surface water and its capital cost	<i>Two Systems, One Drought</i>	§5
SWIFT, the grant covenant, and what DEQ will not model	<i>Two Systems, One Drought</i>	§6
The water the energy buildout actually uses	<i>Two Systems, One Drought</i>	§7
The categorical exclusion outside declared areas	<i>A Line Drawn on a Highway</i>	§3
Where the load sits against the boundary, computed	<i>A Line Drawn on a Highway</i>	§1, §17.1
The model's northern limit at Stafford	<i>A Line Drawn on a Highway</i>	§7.4

Question	Volume	Section
Fairfax Water, Loudoun Water and Prince William Water	<i>A Line Drawn on a Highway</i>	§8, §8a
Caroline's Rappahannock permit, term by term	<i>A Line Drawn on a Highway</i>	§8a.4

What this brief does not settle

Three items are open and are stated here rather than left to a reader to discover.

The Caroline capital cost is not in the record this brief works from. No dollar figure for the Caroline intake and pipeline appears in any of the three volumes. A \$100 million figure that circulates in this corridor belongs to King George County, for a separate transition off the Potomac aquifer, and is press-attributed.^[44]

The model-extent recommendation is numbered two ways. *The Aquifer Says No* identifies the prohibition on permits outside the model extent as Recommendation 7 and describes the uncharacterised region as lying north of Fredericksburg. *A Line Drawn* cites it as Recommendation 1(d) from the Director's slide 18 and locates the limit at Stafford. DEQ's report states Stafford. The two are reconcilable as report numbering against slide numbering, and the geography in the report is the one to use, but the discrepancy is recorded rather than smoothed.

Two claims about the Caroline intake rest on a single outlet. *Two Systems* records at its Sections 3 and 8 that the Rappahannock Tribe appealed the DEQ permit in January 2026 with the Mattaponi Tribe following, and that landowners are contesting the county's use of eminent domain over roughly eleven acres at the intake site. Both rest on *Fredericksburg Free Press* reporting of January to June 2026, at that volume's notes 104 and 211, with no second source. *A Line Drawn* reads the permit in full and carries neither. This brief uses neither. The appeal filings and the circuit court docket would close them, and pulling them is owed to the next revision of *Two Systems*.

Endnotes

- [1] Virginia Department of Environmental Quality, *Senate Joint Resolution No. 25: Groundwater Supply East of Interstate 95*, July 2026, p. 3. [P] The report adds at p. 4 that the Eastern Virginia GWMA "includes a few small areas west of I-95 and excludes a few small areas east of I-95" and that these "minor divergences ... do not appreciably affect the results of the analyses."
- [2] 9VAC25-600-20(A); Va. Code § 62.1-259(ix). [P] The regulation reaches, inside a declared area, "all aquifers located between the land surface and basement rock," 9VAC25-600-20(C). No provision reaching crystalline basement west of the line is present in 9VAC25-600, 9VAC25-610, 9VAC25-200 or 9VAC25-220 as of 25 August 2026. [P, negative for absence]
- [3] Author's computation, 26 August 2026, from `build_pipeline/cross_volume.py` run against the three volume sources. [I] Evenness is normalised Shannon entropy across the three volumes, restricted to subjects carrying eight or more entity-bearing claims; the four named here are those carrying twenty or more claims at an evenness of 0.85 or better. Claim counts by volume: *The Aquifer Says No* 48, *Two Systems* 226, *A Line Drawn* 452, totalling 726. Six subjects have an evenness of 0.000, meaning one volume carries every claim. The full coverage map is in `Cross_Volume_Correspondence_2026-08-26.md` and is a build diagnostic rather than a publication table.
- [4] DEQ, SJ 25, §§ 2.5.3-2.5.4, Table 10 and Figure 37, at p. 69. [P]
- [5] Author's computation from the project Master Inventory, March 2026, 286 geolocated rows, tested against the locality roster of 9VAC25-600-20(A) and against an Interstate 95 centreline covering the highway's full Virginia extent. [I] Precision tiers are 158 exact, 98 approximate and 30 county-level. Full derivation and marginal-case sensitivity in the boundary recomputation memorandum of 25 August 2026, deposited with *A Line Drawn*.
- [6] DEQ, SJ 25, § 1.4.4, "Groundwater Flow Models," p. 21. [P]
- [7] DEQ, *Annual Water Resources Report*, December 2025, Appendix 1, Table 20, p. 52, and Table 5, p. 32. [P] for the two plant figures. The combined 164.0 is the author's addition; DEQ reports the plants separately and publishes no utility total. [I] for the sum. The exclusion is 9VAC25-210-310 A 1.
- [8] DEQ, Virginia Water Protection Individual Permit No. 20-0514, issued 26 November 2025 to the Caroline County Department of Public Utilities, expiring 25 November 2040. [P] The permit's annual figure appears twice and disagrees with itself: 1,832 million gallons per year on the cover page against 1,862 at Special Condition I.D.2.e and in the Permit Decision Rationale. Which controls has not been established, and both are reported rather than reconciled.
- [9] DEQ, SJ 25, Table 10, Northwest Coastal Plain centroid, Caroline County. [P]
- [10] DEQ, *Virginia Annual Water Resources Report*, October 2024, RD512, Appendix 2, Table 21, p. 51 (Prince William County 0.38 GW, 69.74 SW, 70.13 total); DEQ, *Annual Water Resources Report*, December 2025, Appendix 2, Table 21, p. 53 (Prince William County 0.43 GW, 2.15 SW, 2.59 total). [P] The locality attribution for Griffith WTP is Prince William County in RD512, Table 5, p. 32, and Fairfax in the December 2025 edition, Table 5, p. 32. [P] The attribution of the fall to Griffith is the author's, from the arithmetic and the locality change. [I]
- [11] Same two tables: Fairfax County 0.23 GW, 86.86 SW, 87.09 total for 2023; 0.39 GW, 70.08 SW, 70.47 total for 2024. [P]
- [12] Author's inspection of the whole of Table 21 in the December 2025 edition, pp. 53-54, 26 August 2026. [I] No locality row approximates 94.6, the largest being City of Hopewell at 127.54 and Chesterfield at 96.85, both accounted for by their own listed facilities; Loudoun County is 15.61 SW. Both editions reconcile to their own statewide totals, 1,261 and 1,276 MGD, so the absence is not a rounding artefact. DEQ states no rule for what Table 21 includes beyond excluding power generation, and this note does not assert why Corbalis is absent. The gap is recorded at *A Line Drawn* § 8.2, which declined to resolve it on the evidence then available.
- [13] Senate Joint Resolution No. 25, 2024 Regular Session, patron Sen. Richard Stuart, reprinted at SJ 25 Report § 1.1. [P]
- [14] Friends of the Rappahannock, "Press Release: Release Groundwater Study," 20 July 2026, with attached letter to Gov. Abigail Spanberger. [P] for the letter. December 2025 submission to the Secretary of Natural and Historic Resources per contemporaneous coverage. [S]
- [15] DEQ, SJ 25, § 2.5.3, p. 67. [P] DEQ engaged Aquaveo, LLC for the technical evaluations.
- [16] DEQ, SJ 25, § 2.5.2, citing Joint Legislative Audit and Review Commission, *Data Centers in Virginia*, Report 598, 2024, and Fairfax County Department of Planning and Development, *Data Centers: Report and Recommendations*, 2024. [P] DEQ's stated benchmark is approximately 300,000 gallons a day and 3.2 million square feet for a hundred-megawatt campus.
- [17] DEQ, SJ 25, § 2.5.3, p. 67. [P]
- [18] DEQ, SJ 25, § 2.5.3. [P]
- [19] DEQ, SJ 25, § 2.5.4, p. 69. [P] Chowan and Middle James sit in critical cells; 30,000 gallons a day generated an area of impact and lower amounts were not simulated.
- [20] DEQ, SJ 25, § 2.5.3. [P]
- [21] DEQ, SJ 25, § 2.6. [P]
- [22] DEQ, SJ 25, ch. 4. [P]
- [23] DEQ, SJ 25, § 4.2.1 and Recommendation 2. [P] The characterisation of the recommendation as functioning as a categorical bar in served territory is the author's. [I]
- [24] DEQ, SJ 25, § 4.2.3 and Recommendation 5; Va. Code §§ 15.2-2210, 15.2-2223, 15.2-2232. [P]
- [25] DEQ, SJ 25, §§ 4.2.3-4.2.8 and Recommendations 6 and 12; Va. Code § 62.1-44.15:6 B3. [P] The \$9,000 cap is the groundwater figure; the surface water cap is \$12,000.
- [26] DEQ, SJ 25, Executive Summary, appropriations totals. [P]
- [27] Michael S. Rolband, Director, Virginia Department of Environmental Quality, Virginia State Water Commission, 20 August 2026, video time 2:19:19, on Recommendation 1. [S¹] Corrected caption track of the Senate of Virginia broadcast, cited to video time and not confirmed by a second speaker. The meeting page for the State Water Commission carries the Director's slides, the agenda and four further documents; the slides corroborate the recommendation being read but not this sentence. Confirm against the slides or the minutes before quoting in print.
- [28] Virginia State Water Commission, 20 August 2026, from an analysis commissioned by the Hampton Roads Sanitation District. [S¹] Presented at the hearing and repeated by a second speaker; the underlying analysis has not been obtained. Pull it before print. Figures are per thousand gallons over twenty-five years and exclude piping, distribution and power.
- [29] DEQ, SJ 25, Key Point 6 and §§ 2.6.1, 4.2.6. [P]
- [30] DEQ, SJ 25, § 1.4.4, "Groundwater Flow Models," p. 21, under the subheading "VCP Groundwater Flow Model." [P]
- [31] Michael S. Rolband, "Details of Recommendation #1 (continued)," slide 18, item d, presented to the Virginia State Water Commission, 20 August 2026. [P] The recommendation names no geography of its own. The step from the slide to the ground north of Stafford is the author's, joining the slide to the report passage at note 30. [I]
- [32] Author's computation; see note 5. [I] Restricted to facilities operating or under construction the split is 15 inside against 212 outside; restricted to operating facilities alone, 8 against 182; restricted to those recorded with exact rather than approximate coordinates, 4 against 154.
- [33] Author's computation, same source and centreline. [I] Per-county minimum distances to Interstate 95: Fairfax 12.65 km, Prince William 20.69, Fauquier 24.82, Loudoun 30.81, Culpeper 45.44.

- [34] Author's computation, 24 to 25 August 2026. [I] Coastal Plain contact traces extracted from the USGS State Geologic Map Compilation Virginia extract of Virginia Division of Mineral Resources, *Geologic Map of Virginia*, 1993, 1:500,000, as the western updip boundary of the dissolved Coastal Plain map units. Interstate 95 centreline from OpenStreetMap via the Overpass API. Thirteen intersections computed between latitude 38.1055 and 38.5202, seventeen excluding Quaternary cover; six survive the precision allowance. No Virginia agency publishes the contact as a line feature.
- [35] Author's computation from the same source. [I] The Centreport Parkway industrial park polygon is 71 percent Potomac Formation, map unit Kp, and 29 percent quartz diorite gneiss, dgn; the interchange coordinate falls on gneiss, 219 metres from the mapped contact.
- [36] DEQ, *Annual Water Resources Report*, December 2025, Executive Summary, p. vii, and § 2.6, p. 24: "81% (916.16 MGD) of 2024 reported surface water withdrawals were associated with unpermitted facilities" and "Of the top 20 largest reported withdrawals in 2024, 14 are from facilities that are unpermitted." [P] The preceding edition gives 76 percent, 857.9 MGD, and twelve of twenty for calendar 2023: RD512, Executive Summary, p. vii, and § 2.6, p. 23. [P]
- [37] DEQ, *Annual Water Resources Report*, December 2025, Appendix 1, Table 20, p. 52, and Table 5, p. 32; plant locations and ratings from Fairfax Water published materials. [P] for the withdrawals; [I] for the sum. Corbalis is rated at 225 million gallons a day and Griffith at 120.
- [38] Scoped negative finding. No Virginia Water Protection permit for either Fairfax Water intake is present in the corpora searched as of 24 August 2026, comprising deq.virginia.gov, the DEQ environmental data mapping application's VWP individual permit layer, law.lis.virginia.gov, townhall.virginia.gov, rga.lis.virginia.gov, potomacriver.org, fairfaxwater.org, and the Maryland State Archives and Maryland Department of the Environment. [P, negative for absence]
- [39] DEQ, VWP Individual Permit No. 20-0514, cover page, Special Condition I.D.2.e and Permit Decision Rationale; applicant's revised demand projections of 20 December 2024. [P] The intake is engineered as three 42-inch wedge-wire screens on a 30-inch conveyance pipe and the hydrodynamic modelling was run at 13.9 million gallons a day. Cooling exclusion appears twice, on the cover page as "Other uses are not authorized by this permit" and in the Rationale as "industrial cooling uses are not authorized under this permit."
- [40] See note 10. [P] for both editions' figures; [I] for the attribution.
- [41] DEQ, *Annual Water Resources Report*, December 2025, Table 5, p. 32, Appendix 1, Table 20, p. 52, and Appendix 2, Table 21, pp. 53-54; RD512, same tables at pp. 32, 50 and 51. [P] The reconciliation of each edition's Table 21 against its own Table 2 statewide totals is the author's. [I]
- [42] Both editions, Appendix 1, Table 20, and Table 5 headers. [P] DEQ's asterisk convention in Table 20 is one asterisk permitted, two unpermitted. City of Richmond WTP carries one asterisk in the calendar 2023 edition and two in the calendar 2024 edition. The December 2025 edition states that "the five-year average listed is the mean of withdrawal values from 2019-2023 ... the current year is no longer included in the five-year average calculation." This brief does not assert why the permit marking changed. [I]
- [43] *Two Systems, One Drought* v1.2, § 5, corrected at v1.3, 26 August 2026. [P] The correction and its provenance are set out in *Two Systems, One Drought* v1.3 CHANGE_NOTE.md. Recorded here rather than omitted, because a brief that reports an agency's edition drift while concealing its own is not worth reading.
- [44] King George County transition cost per county officials as reported in contemporaneous coverage. [S'] Press-attributed, single outlet, not a county budget document. Pull the county capital plan before print. No capital cost for the Caroline intake and pipeline appears in any of the three volumes. [P, negative for absence]

Deliverable Notes

What this brief is. A cross-volume executive brief on the Virginia water record, drawn from three deposited volumes and from the primary documents behind them. It carries the findings that emerge only when the three are set side by side and routes the reader to the volume that answers a given question. It is not a summary of the three volumes, and a reader who wants a full argument should go to the volume named in the routing table.

**Relation to The Aquifer Says No. This brief does not supersede that volume, and the two are not doing the same job.* The Aquifer Says No* reads one report for one audience, the county supervisors, planning staff, utility boards and residents weighing proposals east of the fall line, and it remains the reading of SJ 25 itself. This brief is statewide, crosses three volumes, and is addressed to a reader who needs to know which of the three to open. Where the two overlap, on the nine-site test and the recommendations, the volume carries the fuller treatment and this brief carries the compression.

Method and grading. Evidence grades follow the series convention: [P] primary, [S] corroborated secondary, [S¹] single source, [I] author inference, with negatives graded as negatives. Grades attach to the claim rather than the document, so a single note may carry a split grade, and weak grades carry an action flag naming the document that would close them. Where a figure is the author's arithmetic on separately reported components, both the note and the body text say so. Every withdrawal figure carries its calendar year, because the two editions of DEQ's report used here carry different years under similar table numbers and the corpus has already lost a figure to that collision once.

Corrections made in preparing this brief. Two figures carried in the project's working notes did not survive the primary check. The Fall Line crossing count is at least six, not eleven; the intermediate computed values are thirteen and seventeen, and eleven appears nowhere in the record. Table 5 of both editions of the *Annual Water Resources Report* is on page 32, not page 31.

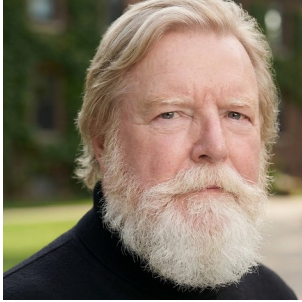
Open items. Three are stated at Section 4 and are repeated here: the Caroline capital cost is not in the record; the model-extent recommendation is numbered differently in two volumes; and two claims about tribal appeal and landowner litigation carried in *Two Systems* rest on single-outlet reporting there and appear nowhere in *A Line Drawn*, so they are not made here.

Evidence snapshot. Current through 26 August 2026. Both editions of DEQ's *Annual Water Resources Report* are held with the research file, and the page pins used here are recorded in PRIMARY_SOURCES_ON_DISK.md.

Disclosure. In July 2026 the author was named to the advisory board of "Data Centers and the Southern Energy Buildout: Implications for Electricity Costs, Energy Transition, and Energy Justice," a 2026-2029 study at Emory University funded by the Alfred P. Sloan Foundation and covering Georgia, Tennessee, and Virginia, for which he receives a token honorarium. This brief was prepared independently and entirely from public sources. The Sloan Foundation and Emory University did not commission it, fund it, supply data to it, review it, or see its findings in advance.

Companion volumes. *The Aquifer Says No: DEQ's SJ 25 Groundwater Study and the Data Center Question East of I-95*, cite all versions 10.5281/zenodo.21556435. *Two Systems, One Drought: Virginia's Groundwater Ceiling, Its Rivers, and the Water the Energy Buildout Actually Uses*, cite all versions 10.5281/zenodo.21816008. *A Line Drawn on a Highway: Virginia's Groundwater Boundary, the Rivers Beyond It, and the Data Center Load the Regime Does Not Reach*, cite all versions 10.5281/zenodo.22105181.

About the Author



Tommy N. Turner is an independent researcher and writer who documents the local-government and energy dimensions of the data center build-out in Virginia. His series of jurisdiction-level case studies covers the counties and the fall-line corridor where Virginia's data center decisions have been made, refused, or contested, and the analytical volumes extend that work into the systems those decisions run on. Three of those volumes take water, and this brief crosses them. Like the rest of the series, the work is assembled from primary records: Department of Environmental Quality groundwater and surface water withdrawal permits and the engineering reports filed with them, the agency's SJ 25 study to the General Assembly and the August 2026 State Water Commission record in which it was presented, both editions of the Commonwealth's Annual Water Resources Report, United States Geological Survey investigations and groundwater atlases for the Coastal Plain, the 1993 Geologic Map of Virginia, the Virginia Administrative Code and the Virginia Register, and county drought plans, ordinances, and board and water authority records. He spent thirty years in corporate banking, banking technology and international consulting before this work, and holds an MBA from Emory. He writes opinion and analysis on Virginia public affairs for outlets including the Richmond Times-Dispatch, the Virginia Mercury, the Virginian-Pilot, the Roanoke Times, Cardinal News, and RTO Insider. The case studies and analytical volumes are published as open, citable living editions, revised as the record moves. He works from Williamsburg and Christiansburg, Virginia.

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