December 16, 2025

Aaron Proctor, Policy Manager
Virginia Department of Wildlife Resources
7870 Villa Park Drive, Suite 400
Henrico, Virginia 23228

Re: DWR Surface Water Withdrawal Intake Design and Operation Standards

Dear Mr. Proctor,

On behalf of the 17 organizations listed below, we write to strongly oppose the Virginia Department of Wildlife Resources' (DWR) proposed *Surface Water Withdrawal Intake Design and Operation Standards*. This proposed guidance significantly weakens protections for aquatic life, introduces a major policy shift in how Virginia manages surface water withdrawals, and is at odds with the Commonwealth's commitments to conserving natural resources. It creates regulatory inconsistencies for existing and future water intake operators, all without a transparent, science-based rationale. Given the ecological and regulatory significance of the deeply concerning proposed changes, we believe the 30-day comment period is insufficient to allow for meaningful public review. For these reasons, the proposed guidance is contrary to state regulation and should not be adopted. We urge DWR to abandon this proposal, retain or improve existing standards, and reaffirm its essential role in providing guidance that consistently elevates protections for aquatic resources.

DWR Role: Providing Recommendations for Appropriate Measures to Avoid, Reduce, or Mitigate the Impacts of Surface Water Withdrawals on Aquatic Organisms

DWR is the Commonwealth's scientific authority on wildlife, and through its guidance is meant to direct the Department of Environmental Quality (DEQ) on how to avoid, reduce, or mitigate the impacts of surface-water withdrawals on aquatic life. DWR staff and resources were used to develop the water intake design standards in the existing guidance, which represented the agency's best understanding of the technologies and practices needed to minimize entrainment and impingement of fish and other aquatic organisms in the Commonwealth. The proposed guidance would supersede existing standards in ways that diverge from the technical recommendations historically supported by DWR and weaken current protections, increasing entrainment, impingement, and harm to aquatic ecosystems.

DWR created the existing general guidance criteria for water intakes, based on an assessment of available technologies and research carried out by fisheries scientists Dr. Charles Gowan, Dr. Greg Garman, and Professor Will Shuart, to ensure protections were relevant to species of

interest in the Commonwealth (e.g. shad, herring, sunfish, perch, striped bass, etc.) as opposed to non-resident species (e.g. salmonids). As described by Gowan et al. in their 1999 paper, "An alternative to site-specific criteria [for each surface water intake, to prevent entrainment and impingement of aquatic life] is to develop generic criteria that can be applied to the entire state… that provide a reasonable expectation of fish protection under most situations."[1] At the time of development, these general guidance criteria were similar to other Atlantic coastal states' recommendations, including North Carolina and Maryland, with respect to screen size and approach velocity.[2] Drawing on the available literature and studies at the time, Gowan et al. concluded that general criteria as restrictive as a 0.25mm effective screen opening size of the water intake, and an approach velocity of 0.05 - 0.1 ft/s, would be necessary to adequately protect Virginia's fish species at their most vulnerable life stages: eggs and recently hatched larvae.

However, they also noted that the available technology for water intake infrastructure at the time had limitations that precluded effective implementation of these standards. As a result, Gowan et al. suggested less restrictive but presumably more achievable standards—namely, a 1 mm effective screen opening size and approach velocity of 0.25 ft/s—with the important caveat that "existing technology [was] not adequate to provide full protection for Virginia's fishes."[3] Garman et al. concluded therefore: "**As new technology becomes available, this criteria should be revised downward**."[4] (*emphasis added*). As such, the guidance that is currently in place represents a compromise between the protections necessary for aquatic organisms and the best available technologies for surface water withdrawals that existed at the time. It is also self-evident that the proposed guidance, which recommends *increasing* both the effective screen opening size and approach velocity, directly contradicts with Gowan et al.'s conclusions and has no scientific basis.

Moreover, DWR's proposed guidance fails to consider the cumulative effects of multiple existing and proposed intakes, which together can lead to substantially higher impingement and entrainment mortality for aquatic life. The potential for additive mortality in waterways from surface water withdrawals has been a concern for the Commonwealth for some time; the Virginia Marine Resource Commission (VMRC) noted in comments on a proposed water intake in 2020, "*...VMRC remains very concerned about the recent increases in requests for intakes in the tidal reaches of the Commonwealth. These areas provide critical habitat for spawning anadromous and resident fishes. Our anadromous finfish species have been and continue to experience depleted stocks. Coupled with the existing "grandfathered" intakes, we are growing increasingly*

[1] Charles Gowan et al., *Design Criteria for Fish Screens in Virginia: Recommendations Based on a Review of the Literature* (Virginia Dep't of Game & Inland Fisheries 1999); see table 2 for comparative criteria, at 17.
[2] Id, at 34.
[3] Id, at 31.
[4] Id.

concerned about the collective impacts of these intakes to our tidal freshwater reaches."[5] In fact, the Virginia Institute of Marine Science (VIMS) is currently studying the effects of water intake structures in tidal waters in the state. VIMS found in a 2024 modelling assessment that three water intake structures in close proximity in the Appomattox River were determined to *individually* have less than a 1% effect on larval mortality; findings that, in isolation, were considered acceptable. But VIMS estimated the collective impact from the three structures to be as high as 7.5% on larval mortality.[6] In *A Framework for the Recovery of the American Shad (*Alosa sapidissima) *in the James River, Virginia,* VIMS identified elsewhere in the James River watershed more than 20 such proximately situated water intakes in critical spawning habitat for American shad.[7] In addition, VIMS specifically identified cumulative impacts from surface water intakes as a significant threat for the shad population in the James.[8]

This work highlights shortcomings in applying general criteria without addressing or acknowledging existing co-morbidities from other withdrawals. Indeed, VIMS' comments on this specific guidance proposal underscore this concern.[9] Moreover, at least one of the studies that DWR cites in the proposed guidance (Freeman & Marcinek, 2006) also identifies potential cumulative effects, finding that increasing water withdrawals were negatively correlated with species richness and ultimately led to the loss of non-generalist species.[10]

The draft guidance document indicates on page 1, section 3 as follows: "The DWR is responsible for reviewing and commenting on surface water intake permit applications and reissuances… and recommends appropriate measures to **avoid**, reduce, or mitigate for those impacts."[11] (*emphasis added*). Despite this explicit charge, the document offers no recommendations for alternatives to surface water withdrawals that would avoid impacts to aquatic life. Such alternatives would include, for example, closed cycle cooling towers, municipal graywater use, and condensation collection systems. Closed-cycle cooling towers can reduce entrainment and impingement by more than 90% relative to once-through systems.[12] Similarly, the use of municipal gray water or condensation capture for water demands is an increasingly common

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[5] Randy Owen, Deputy Chief, Habitat Mgmt., Va. Marine Res. Comm'n, Letter Regarding Proposed Raw Water Municipal Intake on the Rappahannock River (VMRC #20-0514), to Joseph C. Schiebel (June 5, 2020).
[6] Qubin Qin, Jian Shen & Troy Tuckey, *Apply a Particle Tracking Model to Analyze Impacts of Water Intake on Ichthyoplankton Mortality in the Appomattox and the James Rivers* (Va. Inst. of Marine Sci., Numerical Modeling Report submitted to Gannett Fleming, Nov. 18, 2024).
[7] E.J. Hilton, A Framework for the Recovery of American Shad (Alosa sapidissima) in the James River, Virginia (Va. Inst. of Marine Sci., William & Mary 2023) (report submitted to the Va. Gen. Assembly & Sec'y of Nat. & Historic Res.).
[8] Id, at 29.
[9] Lyle Varnell, *VIMS Comments – Proposed Surface Water Withdrawal Guidance*, Comment No. 238437 (Va. Regulatory Town Hall Oct. 24, 2025), https://townhall.virginia.gov/L/viewcomments.cfm?commentid=238437
[10] Mary C. Freeman & P.A. Marcinek, *Fish Assemblage Responses to Water Withdrawals and Water Supply Reservoirs in Piedmont Streams*, 38 Envtl. Mgmt. 435 (2006).
[11] Virginia Dep't of Wildlife Resources, Surface Water Withdrawal Intake Design and Operation Standards (draft Oct. 24, 2025).
[12] U.S. Envtl. Prot. Agency, Technical Development Document for the Final Section 316(b) Existing Facilities Rule EPA-821-R-14-002 (May 2014).

practice that can reduce or eliminate the volume of water withdrawn from Virginia's surface waters and thus prevent or reduce the loss of aquatic organisms from water intake structures via entrainment or impingement.[13] Further, as acknowledged by Gowan et al., time-of-day and seasonal restrictions, paired with the water intake specifications supported by DWR's existing guidance, may also greatly reduce impingement and entrainment risk for Virginia's fish species. This proposed guidance document does not address any of these strategies. Instead, DWR proposes to significantly weaken the standard for water intake structures currently in place and that has been widely accepted for over two decades. Instead, DWR must include avoidance options in the draft guidance.

In short, the proposed guidance is contrary to the agency's stated mission and long-term stewardship responsibilities. Nor does it reflect the best available science as was clear even in 1999 and more so now. Given the depleted populations of several native migratory fish, any revision to the guidance should raise the bar for protecting Virginia's aquatic species, not lower it. DWR should instead take this opportunity to strengthen its recommended measures to avoid, reduce, or mitigate the impacts of surface water withdrawals.

Lack of Scientific Justification for Proposed Changes to Guidance

The proposed changes to the screening guidance lack adequate scientific justification. The draft cites no new data or analysis to demonstrate that the proposed criteria – a 2 mm screen size and 0.5 ft/s approach velocity – are at all comparably protective as the existing standards. Rather, long-standing research shows these parameters to be wholly insufficient. Indeed, several of the sources that DWR cites in the proposed guidance provide evidence to the contrary, indicating a much higher likelihood of entrainment, and thus mortality, for affected organisms from the use of a 2 mm effective screen size as opposed to a 1 mm or smaller screen size. In fact, Gowan et al.'s 1999 assessment explicitly rejected a 2 mm mesh, finding that it would allow entrainment of eggs of 95% of assessed species and 100% of larvae and juveniles.[14] A 2014 Electric Power Research Institute study, updated from the 2006 study cited in the existing guidance, likewise reported *less than 1% entrainment prevention* for five target species using a 2 mm mesh.[15] In sum, despite this evidence, the proposed guidance would weaken the existing standards without presenting any new scientific support, and in the face of contrary research that the proposed guidance itself references. To this point, VIMS concluded its comments on this proposed guidance by stating: "*Until robust evidence is available showing equal or greater protection VIMS will continue to strongly recommend continuation of the one-millimeter screen slot size coupled with the 0.25 foot per second through-slot velocity.*"[16]

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[13] U.S. Dep't of Energy, Alternative Water Sources (Federal Energy Management Program 2025), https://www.energy.gov/femp/alternative-water-sources.
[14] Gowan et al., *Design Criteria for Fish Screens in Virginia*, at 26 (1999).
[15] *Evaluation of Impingement and Entrainment Technologies for Harbor and Haynes Generating Stations* (Electric Power Research Institute 2014).
[16] Varnell (VIMS), *VIMS Comments*, Comment No. 238437.

The Economic Review Form pertaining to the proposed guidance reinforces the lack of ecological justification by stating that the updated parameters "should be a net benefit to current and potential operators" because they align with federal EPA minimum standards and relax prior DWR guidance. Such framing of the alleged benefits while failing to account for the corresponding losses to aquatic life and public-trust resources conflicts directly with DWR's charge to recommend appropriate measures to avoid, reduce, or mitigate the impacts of these surface water intakes on fish and wildlife. This approach raises concerns that DWR is prioritizing recommendations to the benefit of industrial users over its statutory obligations.

In addition, while the proposed guidance also mirrors language from earlier DWR documents, DWR omits the prior explicit recommendations for 1 mm screens and 0.25 ft/s velocities standards based on Gowan et al.'s findings. Instead, DWR merely states that "more Virginia-specific data are needed." But the scientific data firmly reject the notion that a 2 mm screen size and 0.5 ft/s apparent velocity would adequately protect aquatic life and instead demonstrate that, at a minimum, the existing standards are necessary.

Ecological Impacts of the Proposed Change to Guidance

American shad and river herring once held significant economic, cultural, and ecological importance in the Commonwealth. For generations, their migratory spring arrival signaled the changing season and sustained Native American communities and successive generations of Virginians. Catching, salting, smoking, and eating shad became enduring traditions, exemplified by events like the annual Shad Planking festival. Similarly, Atlantic sturgeon once supported a commercial fishery in Virginia and the Chesapeake Bay. Today, Atlantic Sturgeon are federally endangered, while shad and herring populations continue to struggle. The decline of these and other migratory fish, species that return to their natal rivers to spawn, is magnified by the vulnerability of their early life stages, including eggs, larvae, and juveniles, to impingement and entrainment from surface water intakes.

In Virginia, these migratory species, along with resident fish and shellfish species, are directly impacted by the design standards used at water withdrawals, and water intakes have been highlighted as a significant barrier to the recovery of imperiled species.[17] Gowan et al. went into detail regarding *Alosa* species native to the Commonwealth, specifically American shad and river herring, and the appropriate screen size for these species' eggs and freshly hatched larvae. They noted that the distinct shape of these species necessitated smaller effective screen opening sizes– smaller still than what is in place under the current DWR guidance on surface water intake structures.[18] For example, a recent two-year study of the Chesterfield Power Station, a large facility in the James River watershed, found that a staggering 1.67 billion finfish and 106 million shellfish a year were entrained, with the vast majority (94.7%) of the finfish identified in the

[17] Hilton, Framework for the Recovery of American Shad, at 7 (2023).
[18] Gowan et al., *Design Criteria for Fish Screens in Virginia*, at 22, 23 (1999).

herring and shad family, encompassing eggs, larvae, and juvenile fishes.[19] This facility is one of dozens of water intakes situated along the James, including Dominion's Surry Nuclear Power Station, which is permitted to withdraw 1.9 billion gallons of water per day.

A key rationale behind the current water-intake protections is rooted in a traditional fisheries management concept: early-life-stage losses are acceptable as long as populations are large enough to absorb them without suffering long-term decline. This "surplus production" premise assumes healthy, abundant stocks operating near carrying capacity, where some level of mortality does not translate into population-level harm. However, this assumption simply does not hold for Virginia's fisheries today. Alosines and other anadromous species are collectively at historic lows; for example, American shad on the James and York Rivers are well below the benchmarks the Atlantic States Marine Fisheries Commission's Stock Assessment Subcommittee developed for fishery restoration in Virginia.[20] Juvenile striped bass have similarly been found well below their targets in Virginia's tidal rivers, reaching only 30% of the goal for the James River.[21]

It is well understood that depleted fish stocks are less resilient to stressors, both naturally occurring and human-caused, that would otherwise not necessarily limit the success of the overall fishery.[22] In this context, additional losses of eggs, larvae, and juveniles at water intakes are not incidental; they contribute directly to continued population declines for these imperilled species. These losses are especially concerning when considering the potential take of threatened or endangered species such as Atlantic sturgeon. What is more, these declines have potential cascading effects on local ecology, including reduced prey base for striped bass, osprey, and bald eagles, as well as implications for reproductive success for freshwater mussel species, and other indirect effects. Relaxing intake protections at a time when these species are already struggling is inconsistent with sound fisheries management and risks undermining decades of conservation work.

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[19] HDR Eng'g, Inc., Clean Water Act § 316(b) Compliance Submittal Requirements: § 122.21(r)(2)–(9) Reports (prepared for Dominion Energy Va., Aug. 10, 2021) (Chesterfield Power Station, VPDES Permit No. VA0004146), at p. 90, scenario 1.

[20] *This is even more concerning than it first appears, as Hilton et al. note* "For the James River, an interim target of 6.40 [Catch Per Unite Effort] (the geometric mean of the catch index values observed in 1980-1992) is available. However, American shad abundance in the 1980s was insufficient to support the fishery. The James River stock was dependent on hatchery inputs and there is strong evidence of persistent recruitment failure of wild stocks." *Similarly, for the Rappahannock, Hilton et al. state* "...the historical fishery was lower on the Rappahannock than the other rivers, it is possible that this benchmark is artificially lower." *These statements support the notion that ASMFC's benchmarks for Virginia's tidal rivers are potentially too low due to the assessment data used in their creation not reflecting viable population levels to support fisheries, and as a result, the recent annual CPUE assessments are markedly further away from true ecological restoration levels*, Eric J. Hilton et al., *Monitoring the Abundance of American Shad and River Herring in Virginia's Rivers: 2024 Annual Report* (Va. Inst. of Marine Sci., William & Mary, Dep't of Fisheries Sci., Jan. 31, 2025) (prepared for Va. Marine Res. Comm'n, Contract No. F-116-R27).

[21] 5-year geometric mean of first haul data, 2025 Juvenile Striped Bass Seine Survey; Virginia Institute of Marine Science.

[22] J. López & A. Perry, The Most Depleted Fish Stocks in the Northeast Atlantic (Oceana 2022), https://doi.org/10.5281/zenodo.7408382.

Existing Guidance and Flexibility for Dept. of Environmental Quality

The proposed revision represents a significant departure from long-standing permitting practice under the Virginia Water Protection (VWP) program, implemented by the Virginia Department of Environmental Quality (DEQ). For more than two decades, DWR's existing intake standards have been applied across a large number of VWP permits, setting expectations for applicants and regulatory agencies alike. According to DEQ staff[23], these standards have effectively served as the baseline for intake design, with permittees routinely meeting them unless site-specific data have justified or necessitated an alternative approach. This framework has ensured a science-based floor for aquatic resource protection, helping to inform permit decisions across Virginia regulatory agencies at the local, state, and federal levels.

Under the current system, permittees have a pathway, through submission of site-specific data, for deviating from DWR's recommended criteria when justified. Under the proposed guidance, such flexibility would be supplanted by a shift to less protective default measures, increasing entrainment and impingement risks, and ultimately risking greater harm to aquatic ecosystems. Rather than improving the regulatory landscape, the proposed guidance would erode clarity and consistency with regard to minimum ecological protections that have been carefully built into regulatory decisions and permitting over time. Abandoning existing standards signals a retreat from best available science and reduces confidence in the agency's technical recommendations.

When a comment submitted during a public comment period asserts that a guidance document is "contrary to state law or regulation" or "should not be exempted from the provisions of the Virginia Administrative Process Act," the agency must delay the document's effective date for an additional 30 days.[24] Both grounds apply here. This proposed guidance significantly weakens protections for aquatic life, introduces a major policy shift in how Virginia manages surface water withdrawals, and conflicts with the Commonwealth's commitments to conserving natural resources. It also creates regulatory inconsistencies for existing and future water-intake operators, all without a science-based rationale. For these reasons, the proposed guidance is contrary to state regulation and should not be adopted, and the proposal therefore also cannot be exempted from the Virginia Administrative Process Act's requirements.

In Conclusion

The proposed guidance relaxes the previously endorsed DWR standards and without presenting any scientific support. Existing flexibility within the permitting process would be supplanted by a shift to less protective default measures, increasing entrainment and impingement risks, and ultimately risking greater harm to aquatic ecosystems. The native species of the Commonwealth

[23] E. Seavey, DEQ Office of Water Withdrawal Permitting, personal communication, December 10, 2025.
[24] Va. Code § 2.2-4002.1(C) ("If a written comment is received during a public comment period asserting that the guidance document is contrary to state law or regulation, or that the document should not be exempted from the provisions of this chapter, the effective date of the guidance document by the agency shall be delayed for an additional 30-day period.").

that this guidance was developed to help protect are experiencing population declines that necessitate increased protections, not relaxation of them. The scientific consensus likewise supports the adoption of increased, rather than weakened, protections with respect to surface water intakes. In addition, the proposed guidance conflicts with the agency's stated mission and long-term stewardship responsibilities, and is not supported by the best available science.

For the reasons above, DWR should withdraw the proposed guidance.

Thank you for the opportunity to provide comments. We appreciate the important role that DWR plays in managing Virginia's inland fisheries, wildlife, and recreation, as well as helping the public understand and connect with nature.

Sincerely,

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James River Association

Pat Calvert
Virginia Director of Conservation
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