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Senate Bill 168 – SUPPORT

Senate Bill 168 – Environment
Senate Committee on Education, Energy, and the Environment
"Environmental Justice in Confined Aquatic Disposal Act"

My name is William Parks Ball; I live in the Cape St. John community of Anne Arundel County and have been a Maryland citizen and taxpayer since 1992 and lived in Baltimore County until 2016.

I am an Emeritus Professor of Environmental Engineering at Johns Hopkins University, where I previously worked as a Full Professor between 1992 and 2019, teaching undergraduate and graduate courses and overseeing research in the areas of water quality assessment and modeling, specifically focusing on contaminant fate and transport in aquatic systems and engineered water treatment. Applications of this work related to both engineered and natural systems, and in the last ten years of this career I focused most heavily on water quality issues in Chesapeake Bay. I have overseen millions of dollars of federal, state, and NGO supported research projects in these areas and been the recipient of numerous national awards from professional organizations and federal agencies. Through this work, I have had the privilege of working with some of the best minds in the field and have authored or co-authored well over 300 technical publications and national- or international-level presentations, including over 100 peer-reviewed publications in well-respected technical journals. I was Executive Director of the Chesapeake Research Consortium (CRC) for the five years between January 2015 and January 2020. This position, which included a role as Executive Secretary for the Scientific Technical and Advisory Committee (STAC) of the Chesapeake Bay Program partnership, allowed me to obtain a deep understanding of the partnership's now 41-year long effort to manage the protection and restoration of the Chesapeake Bay's water quality and living resources.

Prior to my academic career, I worked for a private environmental engineering consulting firm for six years and rose to the level of Supervising Engineer. During this time, I held Professional Engineering Licenses in Virginia, Maryland, and Pennsylvania, but have subsequently allowed these to expire.

Subsequent to my retirement from the CRC in 2020, I have earned certification as a Master Watershed Steward with the Anne Arundel Watershed Stewards Association, through which I now volunteer my time to help communities and fellow citizens to design and implement watershed improvement projects with objectives of improving local ecosystems and protecting state waters while also adding to land value and community welfare. Finally, it is also relevant that I have been regularly sailing the waters of the Chesapeake Bay for over sixty years and know many of its tributaries and vast coastline well, from Lynnhaven Inlet in Virginia Beach to the Susquehanna Flats. I am presently an active member of Eastport Yacht Club in Annapolis, Maryland, and currently coordinate extensive Educational and Outreach initiatives for the club's Environmental Committee.

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I support Senate Bill 168 for environmental, economic, and societal/cultural reasons. Three categories of concern are listed below, in order of decreasing relevance to my own areas of professional expertise. For each of these -- and especially the first -- I could provide much more detailed discussion but do not consider that appropriate for this simple letter of support.)

- **CAD's environmental impact.**

There is no question that the application of CAD technology will have adverse impacts on water quality and living resources (fish, shellfish, subaquatic vegetation and the large body of smaller organisms that support such life) wherever it is applied. Based on all I have been able to learn (from data collected and shared to date), the level of harm is most likely to be very high and the time to full recovery of the harm done (after all operations cease) will be measured in terms of decades rather than weeks or months.

It is also important to note that ***no*** *environmental benefits* of CAD (relative to other currently practicable disposal options) have to my knowledge ever been identified. Moreover, proving otherwise with any reasonable (>50%) level of confidence would take decades of research costing many millions of dollars and with levels of effort far beyond those currently being applied or even discussed.

It is my professional opinion that the complexities and uncertainties associated with understanding the risks of CAD for large estuarine water bodies such as the Chesapeake are too great to accept. Such complexities and uncertainties exist in all the following areas:

- toxicity of the chemical contaminants in sediments to marine life as well as humans.
- fate of sediment-bound chemical contaminants when those chemicals.
  Release amounts and rates are extremely complex and uncertain to predicts and especially so because they vary with the physical and chemical properties of the sediments themselves and vary with chemistry and other factors in different ways for different contaminants.
- distribution and location of the most contaminated sediments.
  This is a very complex and uncertain question, especially regarding the full suite of legacy contaminants, both known and unknown. High concentrations in individual sediment layers can lead to toxicity to animals from suspended particles, yet remain undetected owing to dilution from other uncontaminated particles, so high resolution sampling is needed. Also, many of the contaminated sediments have now been deeply buried by subsequent deposits and are hopefully no longer doing harm; however, excavation and re-exposure to waterways is risky and poorly understood.[1]

[1] For CAD to make any sense at all, some formerly clean sand must be replaced by contaminated dredge material. But in regions such as the lower Patapsco (off Sparrows Point) a significant portion of the mud deposits above the sand (and some of the sand itself) will also contain legacy contaminants. During both excavation and filling of the CAD cells, contaminated sediments and associated pore water will be passing through the water column and it is impossible to avoid some loss of solids and even greater losses of the porewater and associated contaminants. All the deposited dredge material will have already been classified under state criteria as being unacceptable for most uses and levels of risk are very poorly understood. Issues include the applicability of standard "leach-test" conditions to simulate the range of possible real leaching conditions as well as some very serious universally applicable uncertainties about the composition, concentrations, and toxicity of water contaminants as related to humans, much less to the full suite of marine organisms.

- the hydrodynamics affecting contamination spread throughout the water column and along adjacent shorelines.
  Even the best computer models struggle with the details of water turbulence and the manner in which it interacts with sediments. There are many uncertainties here, yet to be resolved, even for cases where wind and rain conditions are known or safely assumed (which is rarely the case).
- the processes of recovery for hundreds of acres of disturbed bottom, including processes of continued erosion from and sedimentation onto such surfaces.
- the process of recovery for the many organisms living within bottom sediments and that also serve as habitat and food for fish and other species in the water column
- the processes that may allow sediments within CAD cells to spread subsequently into the environment, either via groundwater flowing laterally through the cells, via upward diffusion, or through erosion of sediments into the water column.
- the changing nature of "average" and "extreme" weather conditions that will impact the above-mentioned hydrodynamics and processes.

The point here is not just that science is complex and that our best predictions are always uncertain. The point is that these facts are highly relevant for contamination and toxicity questions in the Chesapeake and that uncertainties are unusually high. Moreover, the concept of CAD (the idea of excavating and refilling large holes in the estuary bottom) is a new one for which we have very little practical experience or empirical data to inform us.

To repeat: It is my professional opinion that the complexities and uncertainties associated with understanding the risks of CAD for large estuarine water bodies such as the Chesapeake and its tributaries are too great to accept. This would be true even the economic benefits well defined or clearly articulated, but in the case of CAD they are not, as discussed below.

CAD's economic impact.

CAD will create a strong negative impact on communities bordering the waters where it is applied. In addition to its likelihood of creating a long-term (decades long) degradation of the waters and river bottoms in and over which these communities work and recreate, the operations of creating and filling CAD cells will be highly disruptive, and environmental harm will be especially noticeable during these periods. During times of active excavation and deposition, boating and fishing will be diverted away from large areas of the waterway well beyond the already busy deep channels. As a result, negative impacts can be expected for marinas, fishing charter operators, recreational fisherman, recreational sailors, and especially those undertaking water contact sports. High concentrations of dispersed sediment will occur during all the many periods of sediment excavation, deposition, and hauling. (Current regulations do not prevent this and no upgraded plans of operation have yet been proposed or tested.)

Beyond this, there is also a very significant concern that there may also be very little, if any, economic advantages of CAD over options of innovative reuse or other available alternatives for disposal of "waste" dredge material. I believe other testimony from other experts may be able to more specifically address these concerns, but it is my understanding that the costs of all the extra

dredging operations will far outweigh any economic gain from having obtained a new source of sandy material.

CAD's social and cultural impact.

As noted in the sections above, the so-called "Confined Aquatic Disposal' (CAD)" approach for managing dredged materials ("spoils") is likely to have very substantial adverse effects on the ecological well-being of any waters where it is applied within the Chesapeake Bay while also creating economic burdens, first to the entire state (owing to its oversized cost), but also an especially high economic and "quality of life" cost on the communities along the shorelines where it occurs. Frankly, in lieu of SB 168, I would prefer to see a bill that bans the use of CAD throughout any region of the Chesapeake Bay -- at least until the necessary body scientific and engineering understanding can be obtained to *assure* minimal environmental risk with a high level of uncertainty. But until that time, Senate Bill 168 is an important step that will at least protect the communities and individuals who are already bearing an unfair share of the costs of keeping the Maryland and national economic engines running.

Finally, there are two other potential perverse and negative impacts of implementing CAD within the Chesapeake Bay and its tributaries:

1) The implementation of CAD will represent a state-endorsed counter activity to the benefits that the Chesapeake Bay Program partnership has been achieving, particularly as related to sediment pollution. Imagine the discouragement to the many watershed stewards who have been working hard in "Critical Areas" and other coastal regions to reduce sediment runoff to tributaries, not to mention the resentments of those who have been fined for failing to meet existing regulations.

2) The implementation of CAD will put the State of Maryland into the business of excavating sand for purposes of "beneficial reuse," thus taking away a source of income from many private enterprises who are either excavating sand themselves (hopefully from more environmentally benign places) or exploring innovative methods of creating alternative "aggregate" materials for use in concrete and various construction and restoration projects. (At least one such "Innovative Reuse" contractor is currently receiving support from the Maryland Port Authority for research and development purposes.)

Summary

Overall, I very strongly support the passing of Senate Bill 168. It is my professional opinion (sincere and strongly held) that the so-called "Confined Aquatic Disposal' (CAD)" approach to dredge material management, at its current state of development, is very likely to have very substantial adverse effects on the ecological well-being of any waters where it is applied within the Chesapeake Bay while also creating additional economic burden on the state and will also

have negative economic impacts on communities near the waters where it is applied. At best, it is still very poorly understood for the Chesapeake Environment.

Within that context, it would be especially inappropriate and unjust to allow the application of CAD near areas that are already overburdened with environmental and economic harms that derive from activities that primarily benefit other regional, state and/or national populations.

Additionally, the passing of this bill may prevent the Maryland Port Authority from wasting more state funds on this ill-conceived CAD notion. Even if it only moves the concept of CAD to regions outside of the Patapsco River, it will help focus more attention toward better understanding CAD's impact before testing it on any large scale.

Finally, and in light of recent federal developments, I will note the importance of differentiating concerns about ***injustice*** (such as this) from concerns that others have expressed regarding affirmative action – i.e. actions affirmatively aimed at righting past wrongs in the areas of diversity, equity, and inclusion (DEI). In this regard – and despite my personal belief that DEI measures are valuable assets for any community, business, or government – it is clear that Senate Bill 168 is about environmental *justice*, and not about DEI (even in a "disguised" way).

Thank you for your kind attention and consideration of these remarks.

Sincerely,

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