

January 31, 2024

Dear Maryland Legislators,

I am writing to provide information relevant to Maryland House Bill 655 and Senate Bill 546. I am a Virginia resident, a faculty member at The College of William & Mary's Virginia Institute of Marine Science, and I have been working on effects of living shorelines on natural resources for many years. I believe I can provide important information on the benefits that living shorelines can provide for both the benthic (bottom-dwelling) food resources (e.g., clams and worms living in seafloor sediments) in Chesapeake Bay, as well as the fish and crabs (e.g., croaker fish, blue crabs) feeding in these coastal systems. I hope this will help Maryland legislators understand the ecological and economic reasons that living shorelines are important to Chesapeake Bay, prior to legislators rendering their decisions on House Bill 655 and Senate Bill 546.

First, I, along with my students, have tracked the effects of living shoreline construction on benthic (bottom-dwelling) invertebrate animal communities in Chesapeake Bay. Coastal erosion and sea level rise have led to increased interest and demand for living shorelines, which incorporate plants and natural materials to stabilize marsh land, over traditional shoreline armoring, such as bulkheads. One of our studies evaluated the ecosystem services provided by living shoreline projects. In a study funded by the National Oceanic and Atmospheric Administration, Center for Sponsored Coastal and Ocean Research, our results suggested that where living shorelines replaced a bulkhead, the resulting benthic community closely resembled that in adjacent marshes with no bulkhead, notably increasing the density and biomass of clams by the second year of study. Bivalves, such as clams, can be a strong indicator of a healthy ecosystem, further suggesting the benefits of living shorelines. The density and biomass of polychaete worms declined at first, but appeared to begin increasing again by the end of the three-year study. Overall, these results highlight the benefit to benthic communities that occur when preventing erosion using living shorelines instead of traditional shoreline hardening techniques. Benthic animals are key food resources for Chesapeake Bay fish and crabs, and benthic organism declines may have ramifications for animals higher in the food chain. More information can be found in the peer-reviewed scientific publication, Davenport et al. 2018, here: <https://rdcu.be/c5xXk>

Second, in two studies, my colleagues and I demonstrated negative impacts of shoreline hardening on fish and crabs in Chesapeake Bay. In one study, we compiled databases from fish net surveys for a large review study using 587 sites in 39 subestuaries in Chesapeake Bay (through meta-analysis: peer-reviewed publication Kornis et al. 2017: <https://link.springer.com/article/10.1007/s12237-017-0213-6>), and found that shoreline hardening had mostly negative effects on estuarine fauna both directly adjacent to the hardened shoreline, and, at a larger scale, as cumulative hardened shoreline increased in the subestuary. In another study (funded by the Chesapeake Bay Trust) to examine threshold effects of hardened shorelines on forage species (e.g., croaker fish, silversides, blue crabs) in Chesapeake Bay, we used a graphical approach to examine patterns in fish and crab abundances in comparison to shoreline development in Chesapeake Bay tributaries by using curves fit to the data, and looking for evidence of threshold declines beyond a certain level of tributary shoreline development. Using piecewise regression curves, we determined that there were threshold declines in seven key fish and crab species when shorelines were developed, and declines in fauna occurred at levels between 10% and 30% of tributary shoreline

hardening. Furthermore, juvenile blue crab density generally declined with shoreline development, whereby for every 10% increase in shoreline hardening, there was a 4% decrease in crabs. This suggests that animals that are economically and ecologically important are negatively impacted by shoreline development, which could be related to a loss of food resources. In addition, developing legislation on a threshold for shoreline hardening may be appropriate, especially for tributaries in highly developed subestuaries. These results have been presented to the Chesapeake Bay Fisheries Goal Implementation Team and at national conferences, but have not yet been published in the peer-reviewed literature.

In summary, multiple studies show negative impacts of shoreline development and positive effects of living shorelines on living resources. **Benthic organisms and the economically and ecologically important fish and crabs that feed on them can all benefit from reductions in shoreline hardening and increased use of living shorelines.**

Please do not hesitate to contact me if you would like further information at 804-684-7698 or seitz@vims.edu. I hope this information will assist you as you prepare your decision on Maryland Senate Bill 417 and House Bill 602.

Sincerely,



Rochelle D. Seitz, Ph.D.