Chesapeake Bay Program
SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE
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May 12, 2017

RE: STAC Boat Wakes Review

Nicholas DiPasquale, Chair, Chesapeake Bay Program (CBP) Management Board
U.S. Environmental Protection Agency
410 Severn Avenue, Suite 109
Annapolis, MD 21403

Cc: Chesapeake Bay Commission; CBP Management Board; Local Government Advisory Committee; Citizens Advisory Committee; Habitat Goal Implementation Team; Public Access Planning Team; Scientific, Technical Assessment and Reporting (STAR)

Dear Director DiPasquale,

Please see the attached STAC review report entitled, "*Review of boat wake wave impacts on shoreline erosion and potential solutions for the Chesapeake Bay*". This report provides a summary of the Chesapeake Bay Commission (CBC) requested STAC-sponsored technical review of boat wake wave impacts on Bay shorelines.

The review panel was tasked with assessing the relevant information available on the potential impacts of boat generated waves on shoreline stability and attendant ecosystem properties (e.g., vegetative habitat, faunal community composition, nearshore total suspended solid concentration), and provide advice on available policy actions to minimize any adverse effects. STAC was also asked to address several questions related to:

(i) erosion and sediment inputs caused by boat wake waves,

(ii) identifying existing data and/or research needs to develop best management practices to minimize shoreline erosion from boat wake waves, and

(iii) political and legal challenges associated with policy actions to reduce adverse boat wake impacts.

In its report, the review panel reviewed available literature, examined relevant data and information from Chesapeake Bay, discussed modeling approaches and highlighted data gaps to further quantify effects on shorelines and ecosystems, and detailed available management and policy actions to minimize potential boat wake impacts.

Through an extensive review of the existing literature, the panel found that the state of the science indicates an unequivocal connection between boat wake energy and shoreline erosion, sediment resuspension and nearshore turbidity. Boat wakes have shown to have erosive effects through the scouring of the bottom of the shoreface, temporarily decreasing water clarity, and disruption of faunal communities and nearshore vegetation. While boat wake energy is largely event-dependent due to vessel shape, speed, water depth, and channel shape, wakes are most destructive in shallow and narrow waterways. Additionally, although boat wakes are periodic disturbances in comparison to wind waves, they have a longer wave period and greater wave height that can contribute to repetitive negative effects, particularly in areas with frequent exposure. Evidence suggests that boat wake erosion impacts the achievement of three of the Chesapeake Bay Program (CBP) Restoration Goals: preservation/restoration of tidal marshes (through enhanced shoreline erosion), preservation/restoration of seagrass beds (through enhanced bottom erosion and increased local turbidity), and water clarity improvements (through increased local turbidity). Furthermore, the panel's findings suggest incorporating boating effects into the suite of Bay modeling tools may help to reduce uncertainty and ensure that restoration projects are sited in the most favorable settings.

There is not currently enough data to determine the extent (spatially and in magnitude) to which boat wakes are contributing to erosion or turbidity of the Chesapeake Bay. The panel conducted an analysis of long-term (~3 year) turbidity data during their review; their results indicate that there is a likely link between turbidity of small waterways, shoreline erosion, and boating activity. However, the relationships between these factors were weak due the lack of direct information and the need to use proxy measures of boating (i.e., number of piers in an area), past erosion experience (i.e., shoreline armoring) and boat wake experience. Policymakers may want to use existing models of boat wake erosive potential to inform decisions on where to designate no-wake zones or other boat policies; however, at this time, we do not have sufficient data to run these models for the Chesapeake Bay. The panel recommends that data be collected to allow for a more thorough analysis of the extent of boat generated wave impacts throughout the Bay, and identified several specific data needs to achieve this goal in the report.

Concurrently, the panel also recommends that protective policy measures should be adopted in highly vulnerable systems to reduce current boat wake energy. Concerns regarding the impacts of boat wakes on Bay shorelines have been voiced for at least 30 years, leading to some regulations through reduced speed requirements in certain water bodies. Virginia, Maryland and Delaware localities have demonstrated authority and willingness to establish wake restrictions, but have not done so comprehensively nor with Bay-wide coordination. In addition, boating activity likely contributes to the desire to armor shorelines: in each of the three tidal creek systems with relatively high boating activity that were examined for this review (Lafayette River, Sarah Creek, Lynnhaven River), approximately 25% of the low energy shoreline (i.e., shoreline not expected to have active erosion from wind-waves) has been armored, suggesting another source of erosion, potentially from boating activity. Management strategies to minimize adverse impacts by addressing boating behavior (e.g., speed limits) rather than shoreline modifications

are preferred to be most protective of the environment. Recommended next steps are to identify highly vulnerable waterways and implement management or policy actions to minimize adverse effects.

On behalf of STAC, thank you again for the opportunity to conduct this review, and we look forward to working with you closely on this and other activities in the future. We are committed to continued interaction between CBC and STAC to further strengthen the effectiveness of restoration efforts for the Chesapeake Bay.

Please direct any questions you may have about this report and its recommendations to Rachel Dixon, Coordinator of the Chesapeake Bay Program's Scientific and Technical Advisory Committee, or Donna Bilkovic (Virginia Institute of Marine Sciences), chair of the review panel.

Sincerely,

Lisa Wainger
Chair, Chesapeake Bay Program's Scientific and Technical Advisory Committee