Quantifying Ecosystem Services and Co-Benefits of Nutrient and Sediment Pollutant Reducing BMPs

STAC Workshop Report
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The Scientific and Technical Advisory Committee (STAC) provides scientific and technical guidance to the Chesapeake Bay Program (CBP) on measures to restore and protect the Chesapeake Bay. Since its creation in December 1984, STAC has worked to enhance scientific communication and outreach throughout the Chesapeake Bay Watershed and beyond. STAC provides scientific and technical advice in various ways, including (1) technical reports and papers, (2) discussion groups, (3) assistance in organizing merit reviews of CBP programs and projects, (4) technical workshops, and (5) interaction between STAC members and the CBP. Through professional and academic contacts and organizational networks of its members, STAC ensures close cooperation among and between the various research institutions and management agencies represented in the Watershed. For additional information about STAC, please visit the STAC website at www.chesapeake.org/stac.

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Executive Summary

On March 29-30, 2017, approximately 50 people representing a range of interests and perspectives met in Annapolis, MD for the *Quantifying Ecosystem Services and Co-Benefits of Nutrient and Sediment Pollutant Reducing BMPs* STAC workshop. The purpose was to identify the "ecosystem service" benefits of implementing best management practices (BMPs) designed to improve water quality and discuss how they could be integrated into existing decision-making tools. Another desired outcome was a shared understanding by workshop participants of the opportunities for, and constraints on, quantifying these benefits. This underlying premise proposes that if local decision makers better understand additional benefits of BMPs they are already working to implement for water quality improvement—benefits such as flood risk reduction, air pollution treatment, and enhanced recreational opportunities—they may be able to better coordinate their investments and meet multiple objectives for their communities.

The presentations and discussions during the two-day workshop demonstrated that the identification, quantification, and valuation of ecosystem service benefits are distinct, but related, activities. That is, benefits must be identified before they can be quantified, and quantified before they can be valued. Furthermore, each of these three separate activities—identification, quantification, and valuation—can be useful for local decision makers, depending on the context. Just understanding that an additional benefit to a management action exists, and is positive, may be enough for some decisions/decision makers, while others may want a more rigorous quantification or determination of value. For example, knowing that a wetland may reduce local flooding and provide downstream water quality may be helpful for some to know, whereas others would like quantified benefits for both.

Another insight coming from the workshop is that benefits accruing from a particular action often vary locally and geographically, therefore, scale and location are important. For example, benefits of carbon sequestration are global whereas flood protection benefits would be very site specific.

Presentations by recognized experts highlighted existing tools/quantification approaches that could, with additional effort, be leveraged by the Chesapeake Bay Program (CBP) Partnership. These approaches included: estimating benefits of green infrastructure practices in the Chesapeake Bay watershed, the social cost of carbon to quantify and monetize benefits of reducing greenhouse gases, and the i-Tree tool that can be used to quantify benefits of trees on air pollutant treatment and soon will be modified to include reduced heat related illnesses.

Through a workshop participant voting process, the following five benefits were identified as the recommended highest priority benefits on which the Partnership should focus future actions on:

- Ecosystem sustainability: benefits to fish and other aquatic resources in local streams and rivers
- Hazard mitigation: flood, drought and fire risk reduction
- Recreation and aesthetics: hunting, fishing, swimming, boating, nature watching, outdoor education
- Drinking water: improvements to both quantity and quality
- Human health: improved air quality, reduced heat related illnesses, fewer water borne illnesses

There were five key findings/observations heard multiple times throughout the workshop which should directly influence Partnership decisions on the next steps in this process:

- Uncertainty is okay, just be upfront about it and clearly communicate about it.
- The location of the BMP will have direct implications in terms of the quantification and valuation of its benefits.
- We need to simplify our language and be clear on definitions of benefits.
- Level of quantification/valuation needed for the BMP benefits depends on the user.
- Keep focused on what local elected officials are concerned about.

The following recommendations came from the workshop participants' discussions on the second day of the workshop, benefitting from the presentations and two rounds of breakout groups:

Recommendation 1: Pick the low hanging fruit and move forward. The CBP Partnership should build upon the Tetra Tech report[1], an evaluation of effects of BMP implementation on each of the CBP's management strategies, capturing both benefits and unintended consequences, if applicable, for each BMP. The product was a matrix that cross-walked the full list of CBP-approved BMPs with our current best understanding of additional benefits. This information could be made more accessible and user-friendly, possibly by incorporating results directly into the CBP Partnership's Chesapeake Assessment and Scenario Tool (CAST) so that it could support short-term decisions and be used to prioritize further work on quantification of benefits besides water quality (see Recommendation 2 below).

Recommendation 2: Pursue efforts for more quantification. For a clearly defined subset of practices and their respective benefits, the workshop participants recommended assembling the appropriate experts to examine methods to quantify additional benefits. The outcome would be a proposed framework and approach by which the quantification of these and other future

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[1] "Estimation of BMP Impact on Chesapeake Bay Program Management Strategies". Accessed here: http://www.chesapeake.org/stac/presentations/274_TetraTech_BMPImpactScoringReport_20170428.pdf

identified benefits from implementation of the BMPs could be measured and incorporated into Partnership's CAST tool. Sources of funding and mechanisms for soliciting research should be considered simultaneously to promote likelihood of future action. An RFP and funding to initiate and sustain this effort should be pursued.

Recommendation 3: Keep the CBP approval process for benefits simple. Having a formal CBP process for approval of new additional benefits from Partnership approved BMPs adds visibility, transparency, and confidence to the resultant use and application of these additional benefits by the partnership and individual partners. However, we don't need the same level of effort nor the same level of scrutiny, review and decision making as we have in place with the Partnership's BMP expert panels operating under the CBP BMP Protocol. Therefore, based on the BMPs, the respective lead Goal Implementation Team will be responsible approving new additional BMP benefits prior to them being added to the CBP partnership's BMP benefits matrix.

Recommendation 4: Seek input from broader set of stakeholders. Though attempts were made to include a diversity of stakeholders at the workshop, the participants still recognized that representation was incomplete. Therefore, additional targeted outreach efforts, listening sessions or focus groups to solicit broader input should be initiated. Specifically, input from a broader array of stakeholders on the following is needed:
- What specific ecosystem services/additional benefits are of the most importance/relevance to them;
- Their recommendations for a more understandable set of terminology to be adopted and used by the Partnership; and
- Feedback on the relative importance of identification versus quantification versus valuation across the range of priority benefits.

Recommendation 5: Factor existing understanding of additional benefits into Partnership's documents. At the request of the CBP Partnership, Virginia Tech is drafting summary narrative and graphical descriptions of logical groupings of the hundreds of CBP-approved BMPs within a larger *CBP Quick Reference Guide to BMPs* to be published in 2018. For those BMPs for which CBP Goal Implementation Teams have already identified additional benefits beyond nutrient and sediment pollutant load reductions, we would add short narrative descriptions of those additional benefits within the forthcoming *CBP Quick Reference Guide to BMPs*.