Chesapeake Bay Program (CBP) Management Board Members,
c/o Michelle Price-Fay, Chair, CBP Management Board
U.S. Environmental Protection Agency Chesapeake Bay Program
1750 Forest Drive Suite 130
Annapolis, MD 21401

May 5, 2022

Re: The Water Quality Goal Implementation Team's concerns with draft CAST-21 updates

Dear Management Board Chair Michelle Price-Fay and Members,

We write to you, on behalf of the Water Quality Goal Implementation Team (WQGIT), to share a consensus-based recommendation and concerns we heard from members on the 2021 draft updates to the Chesapeake Bay Assessment Scenario Tool (CAST-21). The draft CAST-21 updates include an additional 5 to 6 million pounds of nitrogen load that must be reduced across the Bay watershed and about 0.5 million fewer pounds of phosphorus that would need to be addressed.

The magnitude of the additional nitrogen load associated with CAST-21 updates was unanticipated. The increase in nitrogen load is primarily due to increasing agricultural production that includes increasing fertilizer use, animal numbers and manure nutrients, acres in legumes, and improving yields. A portion of the additional nitrogen load is associated with addressing past missing data (i.e., poultry and crop yield data) that was not included in CAST-19, which is the current version. As some WQGIT members note, estimated nutrient loads do not have explicit uncertainty factors associated with the absolute nutrient load numbers. This contributes to concern when CAST draft updates produce larger than expected changes in loads.

Upon the final release of the CAST-21 updates, there is an expectation, however, that jurisdictions in the watershed must reduce the additional nitrogen load through the two-year milestone process by amending the 2022-2023 milestones or addressing the nitrogen load in the 2024-2025 milestone period. Jurisdictions can also choose to amend their Watershed Implementation Plans to address the additional nitrogen load. Jurisdictions are concerned about the draft updates because they do not have plans in place to address the additional nitrogen load between now and 2025. Therefore, they will have to adapt and develop new strategies to attain 2025 targets. Additional partnership engagement is needed to clarify what specific programmatic planning steps (qualitative or quantitative or both) jurisdictions should take to address the additional nitrogen load.

Given the decision and clarifications at the Management Board during 2020, the WQGIT understands that there is no decision in front of the WQGIT to approve or not approve the release of CAST-21, but rather every two years CAST updates factor in new information, including applying Best Management Practice (BMP) efficiencies approved since the previous CAST version, and the most recent data available from sources previously approved by the partnership.

Below we share the WQGIT's consensus-based recommendation on communicating CAST-21. As background, we put the additional nitrogen load associated with CAST-21 updates into context, and share concerns we heard from individual WQGIT members. We also include an appendix, which is a survey of WQGIT members position on five draft recommendations related to CAST-21. Consensus was reached on the one recommendation shared in this letter. We were close to consensus on two other recommendations. We want to brief you on these two recommendations at your June meeting, assuming we get consensus on recommendations.

We respectfully request that (1) the Management Board adopt the consensus-based recommendation and (2) encourage discussion at the Management Board to clarify next steps related to the additional loads to address by 2025.

Sincerely,

Ed Dunne (WQGIT Chair)
Suzanne Trevena (WQGIT Vice-Chair)

WQGIT CONSENSUS-BASED RECOMMENDATION

The Management Board should recommend that a communications plan be developed to communicate CAST-21 and future CAST updates to stakeholders and the public.

Supporting rationale. It is important to communicate to stakeholders and the public what the final CAST-21 updates mean. A communications plan was developed with the release of CAST-19. We advocate for a similar, but more robust, plan with the future release of CAST-21. The plan should consider the following:

- Why CAST is used and what it is used for.
- The updated results and what these results mean or imply. For example, trends in agricultural production and impacts on loads.
- How the results will be used.
- Implications of the results between now and 2025.
- How jurisdiction loads impact others (e.g., federal agencies and local planning authorities).
- How progress for 2025 will be evaluated, what tools will be used, which CAST version will be used and what updates will be included in it, and when the evaluation will take place.
- A list of outstanding issues that will be addressed in a subsequent workplan for future CAST updates.
- Intended audience(s), which should include signatories as well as other federal agencies and local entities.
- How CAST-21 relates to earlier versions of CAST and acknowledge up front these are the best tools we have available, but they do have limitations.

We understand that there are several explanatory documents already developed and available on the CAST website. These are useful resources that may address some of the above considerations to be included into a CAST-21 communications plan. We also understand that a communications plan may already be in development. We encourage the Management Board to be engaged with the recommended plan to ensure it meets partnership needs.

BACKGROUND

By the numbers. In February 2022, the total nitrogen and phosphorus load differences between CAST-19 and CAST-21 show an additional 6 million pounds of total nitrogen and about 500,000 pounds less of total phosphorus.[1] More recently, in March 2022, the additional 6 million pounds of total nitrogen was estimated at 5 million pounds of total nitrogen.[2]

Based on the presentation that was given to the WQGIT on February 14, 2022, about 95 percent of the additional 6 million pounds of total nitrogen load is associated with agriculture. A portion of the additional nitrogen load is a result of incorporating past missing data (i.e., data associated with crop yield and poultry).

What the draft CAST-21 updates mean from a jurisdictional perspective. Table 1 shows that the greatest nitrogen load difference between CAST-19 and CAST-21 was in Pennsylvania and least in West Virginia. This is a substantial difference that impacts funding and resources to reduce additional loads. For example, the 660,000 pounds of additional nitrogen load in New York equates to about one year of implementation, while in Virginia the 1 million pounds of additional nitrogen equate to two years of implementation to reduce nitrogen loads.

According to current estimates of progress with CAST-19, only West Virginia and the District of Columbia are on track to meet nitrogen 2025 loading targets (Table 1). This progress scenario remains similar with CAST-21 updates. The nitrogen load gaps (difference between 2020 progress and the 2025 target), however, are greater for Pennsylvania, Maryland, Virginia, New York, and Delaware because of the CAST-21 updates.

CAST-21 updates move us further away from our 2025 planning target. CAST-21 does not change the 2025 planning target, which is 199 million pounds of nitrogen load from the watershed allowed to enter the Bay per year (Table 1). It does, however, move us further away from the target, making it even more difficult to hit the Bay-wide target by 2025. For example, using 2020 Progress, the gap to the 2025 Target is about 42 million pounds of total nitrogen load. Draft CAST-21 updates increase this gap to 48 million pounds of additional total nitrogen load that must be reduced to hit the 2025 Target.

Putting the additional nitrogen load into context. The additional 5 to 6 million pounds of nitrogen, is similar to the additional nitrogen that must also be reduced by 2025 due to climate change—about 5 million pounds of nitrogen watershed-wide. For additional context, the Conowingo Watershed Implementation Plan cites that an additional 6 million pounds of total nitrogen, due to the Conowingo Dam infill will also be reduced by 2025, per the partnership’s decision. Taken together, to reduce these additional total nitrogen loads requires multiple years of implementation across the watershed.

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[1] The 6 million pounds of additional nitrogen is based on a presentation given to the WQGIT on February 14.

[2] The 5 million pounds of additional nitrogen is based on CAST visualizations made available on March 3.

Table 1 shows the additional total nitrogen due to updating from CAST-19 to CAST-21 by the 7 jurisdictions and at the watershed scale.[3] CAST 19-21 (Reviewed) includes data updates, as presented on Feb. 14, 2022. The effects of broiler and crop yield are shown separately, while (All effects) includes adding together values in the three previous columns. Values for 2020 Progress and the 2025 Target were sourced from the Chesapeake Progress website. The Gap (CAST-19) is the difference between 2020 Progress and the 2025 Target when 2020 Progress is ran in CAST-19. The Gap (CAST-21) is the Gap (CAST-19) plus the CAST-21 (All effects) shown in the fifth column, rounded to the nearest whole digit.

Jurisdiction	CAST-19-21 (Reviewed)	CAST-21 Effect of Broiler Data	CAST-21 Effect of Yield Data	CAST 21 (All effects)	2020 Progress (CAST-19)	Gap (CAST-19)	Gap (CAST-21)	2025 Target
	Million pounds of total nitrogen per year							
New York	0.70	0.00	-0.04	0.66	13	1	2	12
Pennsylvania	1.77	0.12	0.87	2.76	106	33	36	73
Maryland	1.02	-0.02	0.48	1.48	48	2	3	46
Virginia	0.57	-0.02	0.43	0.99	58	5	6	53
West Virginia	-0.15	-0.02	-0.01	-0.17	8	0	0	8
Delaware	0.37	-0.05	0.22	0.54	7	2	3	5
District of Columbia	0.00	0.00	0.00	0.00	1	-1	-1	2
Jurisdiction load to the watershed	**4.27**	**0.03**	**1.96**	**6.25**	**241**	**42**	**48**	**199**

[3] This table was reproduced and modified based on the presentation given to the WQGIT on February 14.

INDIVIDUAL WQGIT MEMBER CONCERNS WITH CAST UPDATES

This section summarizes concerns expressed by individual WQGIT members to WQGIT leadership during the CAST review period. It is not a comprehensive list of concerns, and these concerns are not consensus-based concerns shared by all WQGIT members. We did attempt to synthesize concerns into categories and summarized concerns initially shared by individual WQGIT members, though due to the unexpected volume of feedback we are unable to summarize all feedback below.

A separate "response to comments" document is in development by Chesapeake Bay Program Office (CBPO) and will describe all feedback and comments submitted to the Chesapeake Bay Program (CBP) during both comment periods on CAST-21, which was a separate process and request. That document will be posted to the CAST website and will have a more detailed and comprehensive accounting of feedback provided in that process, whereas this section is summarized and based on verbal and written feedback provided to WQGIT leadership. Many of these comments may be similar to those provided to the CBP but are documented in summarized form here.

Concerns over surprising results or process

Several WQGIT members expressed concerns based on the overall process, the unexpected magnitude of changes in CAST-21 results, or about the complexity of understanding or communicating results.

CAST is a critical tool for planning, but it does create challenges. The CAST tool includes updated science and more recent data every two years. This integrating of new science information is part of the partnership's approach to adaptive management. This approach does, however, create both planning and communication challenges. For example, Maryland's 2019 Phase III Watershed Implementation Plan strategies achieved 112 percent of the nitrogen target based on CAST-17. In 2020, when the partnership updated CAST-17 to CAST-19 the strategies achieved less, about 104 percent of the target. Then in 2021, to account for climate change, Maryland added a strategy to their Phase III Watershed Implementation Plan to address the additional total nitrogen load associated with climate change to achieve their total nitrogen target. Now, with updating from CAST-19 to CAST-21 Maryland does not achieve their total nitrogen target, achieving 89 percent of the target.

The magnitude of the additional nitrogen loads was not expected. Jurisdictions are concerned about this because the magnitude of change in the nitrogen load that included addressing past missing data in CAST-19 combined with data updates in CAST-21, which indicate an increasing trend in agricultural productivity, was not anticipated. Perhaps an established policy could be developed to determine next steps when unexpected load increases occur due to error, missed data, outdated partnership decisions, or any other unforeseen issue.

The time available between now and 2025. There is also a collective concern about the available time between now and 2025 to adapt and develop jurisdictional strategies to achieve 2025 targets.

The CAST-21 review period was lengthy and complicated. For instance, during the CAST-21 review period the additional total nitrogen load was estimated at 6 million pounds, which then changed to 5 million pounds. This load change at the watershed level, affected the additional total nitrogen loads at the jurisdictional level. This caused confusion during review. It is appreciated that EPA CBPO staff communicated and took responsibility for the errors, omissions, and updates to CAST, but there remains uncertainty on how CAST-21 has been updated with regards to the BMP record, rendering a comparison of CAST-21 to earlier versions difficult.

The CAST-21 results are difficult to understand when compared to other data. In Virginia, for example, the short-term flow-adjusted change in total nitrogen from 2011-2020 produced in partnership between Maryland Department of Natural Resources, Virginia Department of Environmental Quality, Old Dominion University, and the Chesapeake Bay Program suggest that total nitrogen levels in the Eastern Shore of Virginia are decreasing with statistically significant trends. However, the CAST-21 nitrogen loadings for this same area show an increasing trend through time for the same period.

Across the watershed, USGS's River Input Monitoring (RIM) network which is used to calculate nutrient loading and water quality monitoring data is showing both long-term and short-term trends in improving total nitrogen loads. For example, in water year 2020, trends in nitrogen and phosphorus loading in the Susquehanna and Potomac rivers were both improving.

In Delaware, the Agricultural Census shows an increase in agriculture acres statewide by 19,250 acres between 2012 and 2017. The 2017 agriculture acres in CAST-19 versus CAST-21, however, shows a decrease by 11,315 acres. The discrepancy between increasing and decreasing agriculture acres is difficult to understand.

Concerns over (fertilizer) data inputs, sources, or methods

Many WQGIT members pointed to fertilizer data as a major need for improvement or reconsideration. Concerns cover both farm and non-farm fertilizer data, both of which are sourced from the Association of American Plant Food Control Officials (AAPFCO). The Urban Stormwater and Agriculture Workgroups have established different methods for processing the data to simulate fertilizer applications.

Ongoing concerns with fertilizer data sources and inputs. There are multiple concerns with the fertilizer data from the AAPFCO. For example, understanding the potential for double counting (e.g., sales of same nutrients to multiple entities and assumption of urban fertilizer being used in agriculture), investigating the assumption that the purchased fertilizer is fully applied in the same year of purchase, and reviewing the methods for aggregating sales data. The Urban Stormwater Workgroup will continue discussions related to fertilizer data and methods this year. The Agriculture Workgroup should be equally engaged in this effort to identify discrepancies.

Jurisdictions were tasked in the past to begin tracking and reporting this data, this effort should be revisited and funded. The AAPFCO data is a reflection of what the data the states provided via each state chemist. If the states want to ensure that their AAPFCO data is as accurate as possible they may need to work with their state chemist to clean up the reporting chain or explore options to directly report fertilizer data to the CBP on a yearly basis.

If the states or the CBP partnership agree to explore alternative data sources or methods, there is a lot of time and resources involved in that process. Parity across jurisdictions is important for fairness as well as feasibility. Specific methods for specific jurisdictions should be used sparingly for extenuating circumstances only (as appears the case with West Virginia urban fertilizer data – see below) and only when it can be done in isolation and not unduly effect other jurisdictions.

CAST-21 introduced new and significant increases in urban fertilizer phosphorus loading. The increase is associated with suspect fertilizer sales data and does not represent on the ground change in West Virginia, for example. The result of this change alone is a nearly 20 percent increase in the total delivered West Virginia phosphorus load to tidal waters. This equates to an increase of 800 percent to the total phosphorus application rate to turf. As newly represented, West Virginia turf is introducing phosphorus at one of the highest rates of all jurisdictions, despite being one of the most rural.

Use of fertilizer data in the federal urban sector. The use of fertilizer data applied in the Urban Sector is of importance to the Department of Defense (DoD) since the model assumes a percentage of DoD turf areas are fertilized and DoD must address those loads. There are concerns about the cost barriers (financial and staff resources) in developing Urban Nutrient Management (UNM) plans to refute a false assumption of lawn fertilization on military installations. Any potential increase in nutrient loads from assumed fertilizer application only exacerbates the burden created by this false assumption. On a separate but parallel tack, the UNM BMP should be altered to allow for DoD, or other federal agencies, in-house, to refute the fertilization assumption all together without having to hire a certified professional to make the same assertion.

<u>Other concerns that are general or cross-cutting</u>
Additional concerns with broader implications shared by the WQGIT membership during CAST-21 discussions.

Grappling with uncertainty and expectations. The uncertainty and confusion of CAST-21 coupled with the discussions of Phase 7 makes it difficult to understand the big picture when only 3 years away from 2025. Models will always have uncertainty, whether through missing data, errors, inaccurate input data, or unreported BMPs. Jurisdictions should not be expected to expand on the already challenging implementation goals this late in the process. All of this should be revisited with the Phase 7 modeling tools and an overall assessment of progress in 2025 with a priority on observed, empirical monitoring data.

Concerns related to Ag Census data. In Delaware, the 2018 full season soybean projections from the Agricultural Census from 2012 to 2017 shows in increase of 98,247 acres. The implication of the increase in full season soybean acres is much higher in Delaware than other states, and the impact of the change from double cropped to full season in the model has a drastic impact on loads. Unfortunately, there are no tools to manage load changes when shifting between cropping cycles occurs.

APPENDIX: SURVEY OVERVIEW BY RECOMMENDATION

This survey is based on the April 19 draft version of letter.

Total responses: 13 (all 9 signatory members, plus 4 of 6 At-Large members)
Note: Additional comments provided via the survey are not included here but will be used to build consensus.

1. **The Management Board should clarify expectations for how jurisdictions must address additional nutrient loads from CAST updates.**
    - Endorse (5): CBC, DE, MD, Kevin du Bois, DoD (At-Large), Mike LaSala, LandStudies (At-Large)
    - Agree with reservations (4): WV, PA, EPA, KC Filippino, HRPDC (At-Large)
    - Stand aside (2): NY, DC
    - Hold (2): VA, Joe Wood, CBF (At-Large)

2. **The Management Board should recommend that the implications of the additional 2 million pounds of nitrogen associated with missing data and errors be considered when EPA evaluates milestone progress.**
    - Endorse (4): WV, CBC, PA, Mike LaSala, LandStudies (At-Large)
    - Agree with reservations (3): MD, Kevin Du Bois, DoD (At-Large), Joe Wood, CBF (At-Large)
    - Stand aside (4): NY, DC, DE, KC Filippino, HRPDC (At-Large),
    - Hold (2): VA, EPA

3. **The Management Board should recommend that a communications plan be developed to communicate CAST-21 and future CAST updates to stakeholders and the public.**
    - **Consensus**
    - Endorse (9): DC, DE, MD, PA, VA, WV, CBC, PA, Joe Wood, CBF (At-Large)
    - Agree with reservations (3): EPA, KC Filippino, HRPDC (At-Large), Kevin Du Bois, DoD (At-Large),
    - Stand aside (1): Mike LaSala, LandStudies (At-Large)

4. **The Management Board should recommend that the CBP partnership address problematic data sources that are used as inputs to CAST before future releases of CAST.**
    - Endorse (7): CBC, DC, DE, MD, PA, VA, WV,
    - Agree with reservations (5): NY, Kevin Du Bois, DoD (At-Large), Joe Wood, CBF (At-Large), Mike LaSala, LandStudies (At-Large), KC Filippino, HRPDC (At-Large)
    - Stand aside (0):
    - Hold (1): EPA

5. **The Management Board should encourage the partnership to establish updated policies and procedures to govern future updates of CAST.**
    - Endorse (7): DC, DE, PA, VA, CBC, Mike LaSala, LandStudies (At-Large), Kevin Du Bois, DoD (At-Large),
    - Agree with reservations (5): MD, NY, WV, EPA, KC Filippino, HRPDC (At-Large)
    - Stand aside (0):
    - Hold (1): Joe Wood, CBF (At-Large)