

Review of CAST Phase 6 Prior to Releasing an Updated Version

The flowchart schedule below shows the process steps and schedule for Chesapeake Assessment Scenario Tool (CAST) releases. The left flowchart is the initial schedule developed for prior CAST updates. The right flowchart is one option for future CAST version updates.

For CAST-2021, we spent the month of September undertaking a CBP staff review of the processed CAST nutrients applied and loads data. This included graphing those data and providing the data and graphs to the **Implementation and Evaluation Team (IET)**. The data review is an important step that allows us to be prepared for the questions and concerns that we anticipate the Water Quality Goal Implementation Team (WQGIT) and others to bring forward. This analysis focused on the following:

- Identifying shifts in overall loads
- Determining if some states are disproportionately affected or if loads shift in different directions for some states
- Assessing which load sources show the most change
- Determining how much of the changes are due to data updates and how much is due to the updated Best Management Practice (BMP) history.
- All detailed updates are posted here: <https://cast.chesapeakebay.net/About/UpgradeHistory>

Improvements are necessary and welcome. The process outline below can serve as the basis of a framework for addressing data abnormalities evidenced in Phase 6 CAST going forward.

Data input QA/QC Process *

CBP IET and Source Sector Workgroups* (gray box): Begins Feb 1st, the model update review process should begin with a quality assurance review of data input sources, data preparation methods, model processing methods- including a review of the processing of data that informs the load, along with corresponding documentation. The process, methods and documentation review should begin within appropriate source sector workgroups in Feb/March of a data update year, and need not wait for the new data to become available. As soon as new data becomes available a data specific quality assurance review should begin. Workgroup coordinators should initiate this process with support from the CBP IET to maximize the review period prior to the approval of new data and methods.

For example: the 5 year Ag Census is usually released in February but may be delayed, however review of the documentation, data processing and quality assurance methods can still begin in February in the AgWG, with data specific review occurring once final dataset becomes available, both must be completed by September 30 of that year.

Other model inputs such as fertilizer, land-use (expected in June), newly approved BMPs, NASS yields, and animal nutrient generation data should be treated likewise.

Jurisdictional domain input data (light green box): such as construction acres, harvested forest acres, and animal permitted/nonpermitted splits should be similarly reviewed by each jurisdiction prior to submittal to the CBP by August 31st of that year.

A comprehensive list of CAST input data can be found on the CAST website at *Progress Reporting- "CAST Data Update Frequency"* and is linked here:

<https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/CASTDataUpdateFrequency-20230131.xlsx>

Source Sector Workgroups Approve Data and Methods (dark blue box): by Sept. 30th, this formal approval by relevant workgroups marks the completion of the process described in the gray box above

WQGIT approves new data and methods (purple box): workgroup approved data and methods are presented to the GIT for review, discussion, and approval by Oct. 31st

Development Team has incorporated new functionality into CAST (orange box): this is the process of incorporating the newly approved data and methods into the model, completed by Nov. 30th

CAST output review by CBP IET is completed (red box): the Implementation and Evaluation Team will review model outcomes to ensure functionality, check for problems and make needed adjustments by Jan. 31st

Final BMP and wastewater submission for annual progress (dark yellow box) finalized by Feb. 7th, all jurisdictions submit this data from July 1 to June 30 of previous year for annual progress and have the opportunity to submit historical data revisions from 1985-June of the previous progress year during a CAST update

Data Results/Anomalous Output QA/QC Process *

Partnership Review Begins (first light blue box):** Begins Feb. 8th, Involves CBP IET Partnership support and Partnership identification of anomalies. Jurisdictional review must occur in a timely fashion-it should begin as close to Feb. 8 as possible. Partners will be supported in their review of model outcomes by the CBP EIT staff, who will be available to answer questions, investigate issues and provide jurisdictional support products (such as the CAST Comparison Tool) for viewing and analyzing data.

Partnership should make assertions for unresolved data anomaly/illogical output issues by March 31st to the IET and relevant source sector workgroup.

Illogical Results Focus* (second light blue box) Begins April 1st,** EIT and appropriate source sector workgroup will provide Partnership support in continuing further investigation of contended anomalies. The contender should be able to illustrate/explain why data results are illogical to these entities. The contention should be scientifically validated and show that the modeled result is not representative of real change that has occurred from the previous model version, workgroup members should confirm or agree that results are illogical. If agreed upon, the workgroup, supported by IET seeks resolution of the anomaly with the goal of approving the proposed solution by late May.

Final Partnership Comments**(third light blue box): Due May 31st,** comments should include a documentation of persisting unresolved issues. If resolution of the anomaly has not been achieved at the workgroup level, the contender documents the issue in their Final Partnership Comments and the issue should be presented to the WQGIT for review. The partnership would need to confirm the results are illogical, and that no acceptable resolution has been proposed by the workgroup/IET.

CBP Response to Final CAST Comments*** (dark green box): Due July 31st,** if WQGIT confirms the issue remains unresolved, the comments would include a proposed path forward. The IET and appropriate source sector workgroup continue work on the issue until an agreed upon solution is achieved. This would include the option to revert to previous model data and methods related to the anomalous results if no resolution can be achieved, and CAST update is released on schedule. The IET and appropriate source sector workgroup continue work on the issue for a future update.

CAST Release: newly updated and approved version of the model released for public use

