



**Chesapeake Bay Program**  
*Science. Restoration. Partnership.*

# Review of Model Development Timelines

Management Board Meeting  
September 11, 2025  
Lee McDonnell/Bo Williams

# July 2025 MB Meeting Proposed Decision

**Initial Decision Language:** Direct the WQGIT to investigate the model development process and, if necessary, recommend improvements. Consider the feasibility of setting a minimum frequency for model version updates.

**Point of clarification:**

- What is meant by “model version updates”? Does this mean a new Phase or periodic updates to CAST?

# Model Phase Changes

## *What is a “phase change”?*

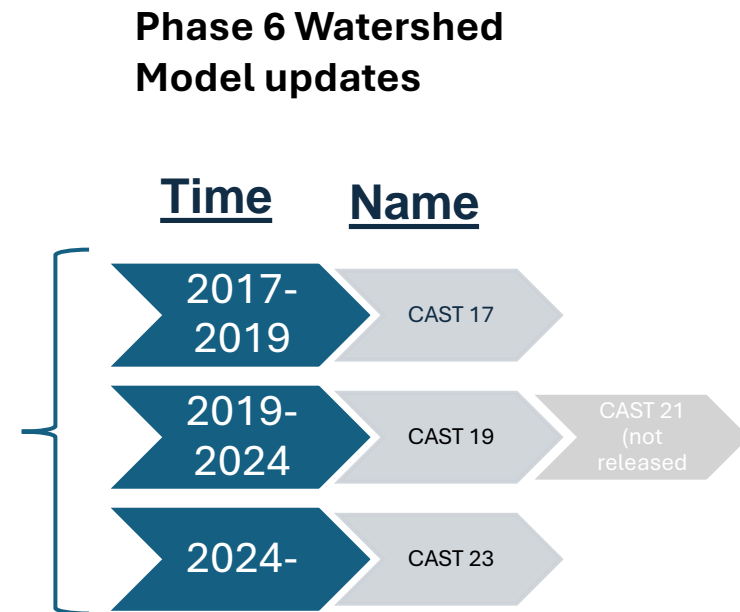
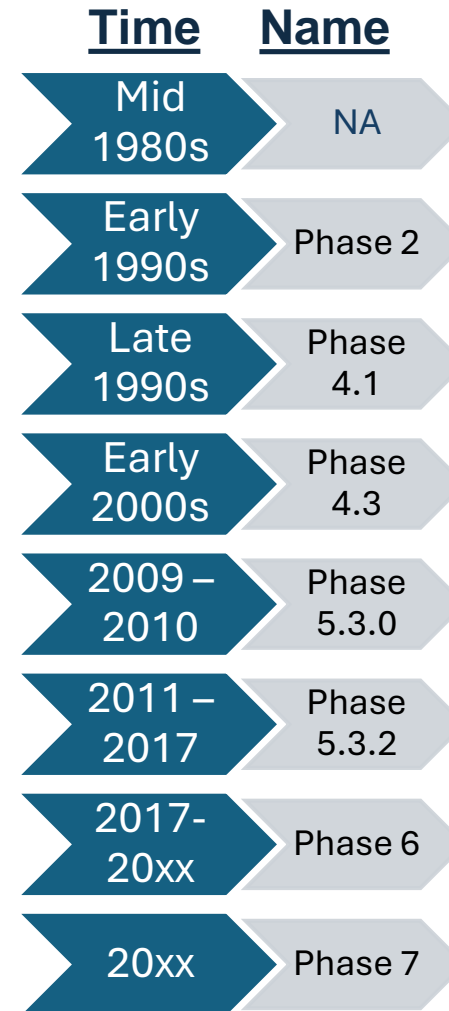
- Includes whole modeling suite, not just watershed model/CAST. Includes estuary model, airshed model, watershed model, and other tools
- Incorporates new data, science, BMPs, and calibration to water quality monitoring
- Leads to setting of new targets

<u>Time</u>	<u>Name</u>	<u>Scenarios</u>
Mid 1980s	NA	0
Early 1990s	Phase 2	<10
Late 1990s	Phase 4.1	37
Early 2000s	Phase 4.3	400+
2009 – 2010	Phase 5.3.0	300+
2011 – 2017	Phase 5.3.2	1000 or so
2017- 20xx	Phase 6	1000s per year
20xx	Phase 7	Many more...

# Model Version Updates

What is a Version update?

- Updates to the watershed model/CAST (e.g., CAST 19, CAST 23)
- Includes new data and changes to inputs, land use, etc. and documentation
- “Minor upgrades” include bug fixes, user improvements, etc.



---

---

# Revised Decision Language

Direct the WQGIT, in consultation with appropriate CBP workgroups and advisory committees, to investigate the frequency of CAST updates in Phase 6 and the development of Phase 7. Upon finalization of the Phase 7 suite of models, the WQGIT is asked to provide recommendations for improvements to the frequency of model version updates for CAST under Phase 7 and a potential horizon for developing a future new model suite (Phase 8).

# Example: Model Version update (CAST-23)



### Update released on May 21, 2024

- This release is of CAST-23, the new version of CAST. **Updates change the loads in all scenarios in all years. This includes your own scenarios, scenarios shared with you, and public scenarios.** Public scenarios and the shared scenarios owned by CBP Admin are recalculated for you. You need to transition run your own scenarios from CAST-19 to CAST-23 using the "Migrate Scenarios" button on the Scenarios page. Once you move your scenarios, run the scenario to see the new loads. Just click on the green run arrow next to the scenarios. Scenarios can run simultaneously.
- The official Phase III WIPs are those that are in the CAST version in which they were developed. The loads change in all scenarios, including the WIPs, in this new version. The BMPs from the Phase III WIPs are available in the scenario "WIP 3 CAST-2023 Version". The loads from the original version of the WIPs are available in the scenario "WIP 3 Official." The 2025 Phase III Planning Targets do not change. The milestone goals do change. The 2009 progress changes since the entire history of BMP implementation is re-run with each new version of CAST. With the 2009 starting point adjustment, the trajectory to the 2025 planning target endpoint shifts. As we get closer to 2025, the effect of the shift is less than earlier years since we are closer to the anchored 2025 target. The milestone goal will step up with each cycle (80% in 2021, 90% in 2023). The unaccounted additional loads are not in the CAST scenario results and are loads that EPA will not hold jurisdictions accountable for in 2025. Use the [CAST Planning Target](#) tool to compare planning targets to public scenarios.
- The detailed changes between CAST versions is documented on the About menu under [Model Documentation](#).
- The changes that impact loads include:
  - BMPs submitted, including the TMDL critical period, are updated. This update impacts multiple estimates including the BMPs credited through 2017 land use (except for forest buffers, tree and forest planting, which is 2002), the amount of nutrients applied to meet crop needs, and the historic manure transport of total phosphorus through 2016.
  - The agricultural land use total acres are now determined by the Land Data Team's change product from 2013 rather than the USDA Agricultural Census total acres.
  - Agricultural and urban fertilizer sales data are updated to include data reported to American Plant Food Control Officials (AAPFCO) through 2016. The missing fertilizer for 2013 and 2014 was corrected. State-supplied fertilizer data is utilized for 2017-2020.
  - New fertilizer sales data results in new urban fertilizer application rates for the years 2013 through 2025.
  - The 2013-2025 land use acres, septic systems, and sewer service areas are updated. Base conditions are newly available through 2030.
  - Maryland biosolids are updated. The amount for other jurisdictions is simply carried forward for all future years.
  - Pennsylvania updated their combined sewer overflow reductions.
  - Virginia's insignificant facilities wastewater data was updated for 2014-2020.
  - West Virginia found errors in their 2009 wastewater data and corrected those, leading to an increase in loads.
  - Virginia and West Virginia's harvested forest acres are updated for 2021. Maryland's 2013 to 2021 harvested forest acres are updated.
  - Construction acres are updated for 2021 in all states except Maryland. New York updated construction acres for 2016-2021.
  - The split between Pennsylvania's permitted and nonpermitted feeding space has been updated.
  - The amount credited for tree BMPs that are credited in the land use rather than credited in the submitted BMPs is changed. The tree BMPs are now credited 15 years prior to the date of the aerial imagery in the land use. These BMPs include forest buffers, tree planting, and forest planting.
  - The credit duration of RI-9: Forest Nutrient Exclusion Area and RI-10: Forest Buffer on Watercourse is extended from 10 to 15 years.
  - Changes to nutrient application eligibility in Phase 6 CAST. This change allows all crop nutrient applications to be both manure and fertilizer eligible if that crop/land use allows it.
  - Virginia's regulated/unregulated developed acreage in CAST is corrected.
  - Updated BMP history (as of February 2024)
- BMPs that were approved for planning will become available for annual reporting:
  - The urban stream restoration protocol #5 is available.
  - The urban stream restoration default value is not available for annual reporting after 6/30/2022.
  - The credit duration for tree planting, forest planting, and forest buffers was changed from 10 to 15 years. The credit duration indicates the time frame that a BMP is considered valid without inspection. With inspection, a BMP is credited indefinitely.
  - The impervious disconnection BMP was corrected so that it can be applied only on impervious land. Previously it was available on pervious land.
  - The abandoned mine reclamation BMP is now credited as a land use change to forest.
  - The wetland BMPs creation and rehabilitation are updated per the expert panel report. The wetland enhancement BMP is removed.
  - The grey infrastructure nutrient discharge elimination BMP was added to CAST-23.
  - Wetland BMPs have no credit duration.
  - Animal mortality BMPs are available.

<https://cast.chesapeakebay.net/About/UpgradeHistory>

# Example: updates (all still CAST-23)



[HOME](#) [NEWS](#) [PUBLIC REPORTS](#) [LEARNING](#) [ABOUT](#) [CONTACT US](#)

Search Cast... 

## UPGRADE HISTORY

### Update released on June 25, 2025

- Version Phase 6 - 7.14.3. Model version remains CAST-2023.
- The manure transport BMP logic now allows manure to be transported into areas where there are no animals and no crops. Previously, that manure was not counted in the area.
- Security updates were made.
- This update affects the loads in the 2024 Progress scenario in Charlottesville and Alexandria, Virginia.

### Update released on June 3, 2025

- Version Phase 6 - 7.14.2. Model version remains CAST-2023.
- The official 2024 Progress scenario is now available on CAST. This scenario reflects best management practices (BMPs) that were implemented and functioning during the reporting year July 1, 2023 - June 30, 2024, as reported by jurisdictions to the Chesapeake Bay Program, and verified by the Environmental Protection Agency (EPA).

### Update released on April 17, 2025

- Version Phase 6 - 7.14.2. Model version remains CAST-2023.
- All instances of the phrase "Climate Change" are updated to "Changing Environmental Conditions (CEC)."

### Update released on March 13, 2025

- Version Phase 6 - 7.14.2. Model version remains CAST-2023.
- This release is an update to the NEIEN/CAST Validation reports, accessible to select users through the NEIEN Portal.
- This update resulted in a slight reduction (<1%) in stormwater sector loads for 2019 to 2023. If you have used prior years' data in any analyses between 12/6/24 - 3/13/25, we encourage you to redownload the latest versions to ensure these updates are reflected.

### Update released on February 27, 2025

- Version Phase 6 - 7.14.2. Model version remains CAST-2023.
- The 2024 wastewater is available. 2024 Progress is not yet available.
- Miscellaneous updates to the backend framework.

### Update released on December 9, 2024

- Version Phase 6 - 7.14.1. Model version remains CAST-2023.
- Stream restoration calculator fix for nutrient reduction credit population error.
- Clarification of error message when selecting multiple BMPs to delete in Edit Scenario.
- Updated 2024 base conditions are now available.
- Miscellaneous bugs and fixes
- Note: CAST reports will still reflect version number 7.14.0

### Update released on November 20, 2024

- Version Phase 6 - 7.14.0. Model version remains CAST-2023.

<https://cast.chesapeakebay.net/About/UpgradeHistory>