Chesapeake Bay Program
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Phase 7 Timeline

WQGIT

August 2024

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- Life Scientist, EPA
- Pronouns: He/Him

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Phase 7 Update

Following CAST-23 release, the model's current Version Phase is 6 - 7.12.1.

Currently in development, is Phase 7 of the CAST model. The Phase 7 Modeling Tools will be used by the partnership to inform decisions related to nutrient and sediment reduction goals outlined in the Chesapeake Bay Watershed Agreement. Integral to this updated suite of tools is the ability to project climate change effect through 2035.

All of these tasks are for our internal schedule and it is dependent upon the entire partnership to assist with the completion of these Phase 7 projects.

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https://www.chesapeakebay.net/what/programs/modeling/phase-7-model-development

Phase 7 Timeline Interrelated Projects and Points of Contact

1. High Resolution Land Use – Peter Claggett
2. Chesapeake Assessment Scenario Tool (CAST) – Olivia Devereux
3. Optimization – Lew Linker
4. Agricultural Inputs – Tom Butler
5. Atmospheric Deposition Modeling – Lew Linker
6. Watershed Modeling – Gary Shenk
7. Estuarine Modeling – Lew Linker
8. Criteria Assessment – Peter Tango

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High Resolution Land Use

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Peter Claggett	High-Res Land Use	1-meter Land Use					
		Historical Land Use					
		Sewer and Septic Population					
		Future Land Use (2022-2100)					

High resolution land use products are being developed at the meter scale for delivery in 2024. They will go directly into the watershed modeling efforts and provide information for other CBP partnership goals and outcomes

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CAST

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Olivia Devereux	CAST	BMP Reporting and Transparency					
		Spatially Explicit Maps and Planning					
		CAST-General					

CAST has received upgrades to improve transparency and usability as part of a project that will also redesign the process for submitting management practice data. Additionally, a spatial interface to CAST will be designed to give output for a user-defined spatial extent.

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Optimization

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Lew Linker	Optimization	Scalability Studies and Improvements using Learning Engine and Parallel Computing					
		User-friendly and routine applications with enhanced optimization procedures					

Optimization software is being developed so that CAST scenarios can be generated representing the least cost to achieve a desired level of nutrient and sediment reduction.

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Agricultural Inputs

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Tom Butler	Agricultural Inputs	Manure application					
		Crop Yields					
		Mortality					
		Fertilizer Data					
		Industry Data					
		Application algorithm					

The Agricultural Modeling Team will examine and revise the agricultural inputs to CAST. The goal is to achieve a realistic representation of the nutrients from manure, commercial fertilizer, fixation, crop uptake, soil storages, and other agricultural inputs over time

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Atmospheric Deposition Modeling

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Lew Linker	Atmospheric Deposition Modeling	1985-present CMAQ Deposition timeseries					
		Decarbonization of Economy Scenarios					
		Completion of Phase 7 Library of CMAQ Airshed Model					

The CBP is using the EPA's Community Multi-scale Air Quality (CMAQ) model to track atmospheric deposition of nitrogen. The latest version of the CMAQ model will be used as input loading to the watershed model. A source apportionment model (CMAQ-ISAM) will be used to estimate changes due to proposed emission reductions beyond State Implementation Plans

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Watershed Modeling

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Gary Shenk	Watershed Modeling	General	.,				
		Variable Scale Modeling					
		Nutrient Application Calculation					
		Physical Process Simulation					
		Uncertainty Quantification					
		Improve Climate Change Modeling					
		Main Bay and Tributary Models					
		High Res Land Use					

The watershed model underlying the CAST calculations is being updated for better representation of physical processes, improved nutrient application calculations, and variable-scale modeling.

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Estuarine Modeling

Point of Contact	Phase 7 Finalization Project	Project Tasks	2024	2025	2026	2027	2028
Lew Linker	Estuarine Modeling	Interim MBM and MTM Development					
		Final MBM and MTM Development					
		MBM and MTM Review and Application					
		Continuous Activities					

A new estuarine model is being developed for the entire tidal Chesapeake (the Main Bay Model or MBM) incorporating the latest techniques. Multiple Tributary Models (MTMs) will also be developed as testbeds for improved overall model performance.

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Criteria Assessment

This project's tasks are not outlined in a table.

Please reach out to Peter Tango, Rebecca Murphy, and Richard Tian with further questions.

The estuarine water quality criteria assessment procedures are being considered for revision based on climate change considerations. A separate effort looks to create a new Bay interpolator using vertical profiler data which can evaluate criteria which could not previously be evaluated. The collection of data is being coordinated through the Hypoxia Collaborative Team and the development of data analysis methods is coordinated in the Bay Oxygen Research Group.

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Further Phase 7 Details

A more detailed excel version of this timeline will be posted online in September and a notice to WQGIT members will be sent out when it is available.

This detailed version will outline subtasks associated with each of the Phase 7 interrelated projects, and dependencies among projects and expected dates when approvals from the WQGIT or associated WGs are required.

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Phase 7 Timeline Key Dates

- **December 2024:** PSC introduction of high-level Phase 7 timeline
- **January 2025:** Revisiting of Phase 7 timeline and status of projects
- **September 2025:** UNM Expert Panel Findings Expected
- **November 2025:** Agricultural Inputs finalized for Phase 7 incorporation
- **December 2025:** RAND Climate Change Efficiency Report expected
- **2026:** Partnership and STAC Independent Review!
- **2027:** Responding to outstanding items and fatal flaws from Beta releases
- **December 2027:** Tentative release

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Thank you!

Any questions?
You can contact me at smith.auston@epa.gov

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