

Phase 7 Plans

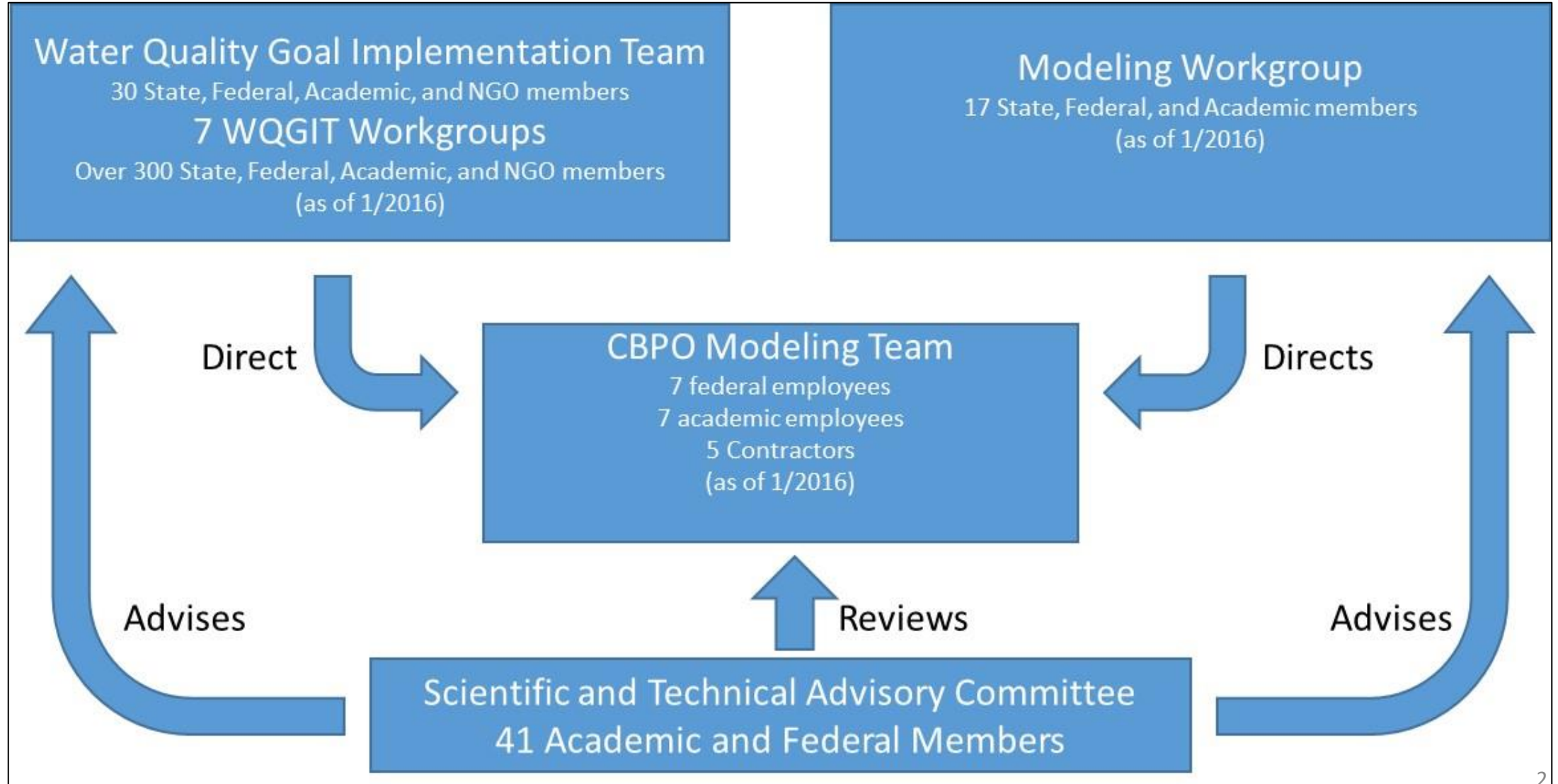
Gary Shenk – CBPO

WQGIT

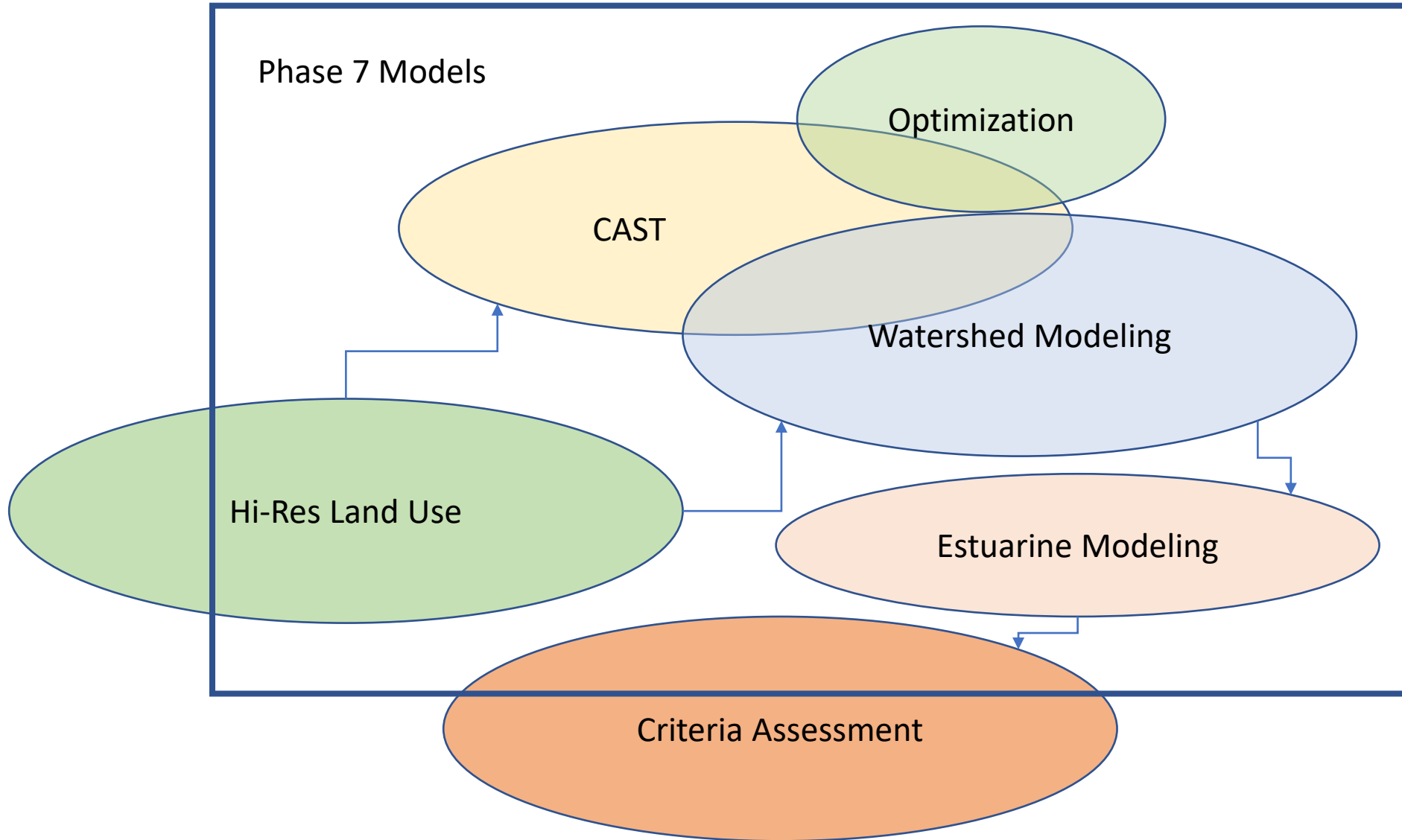
04/25/2022

Governance

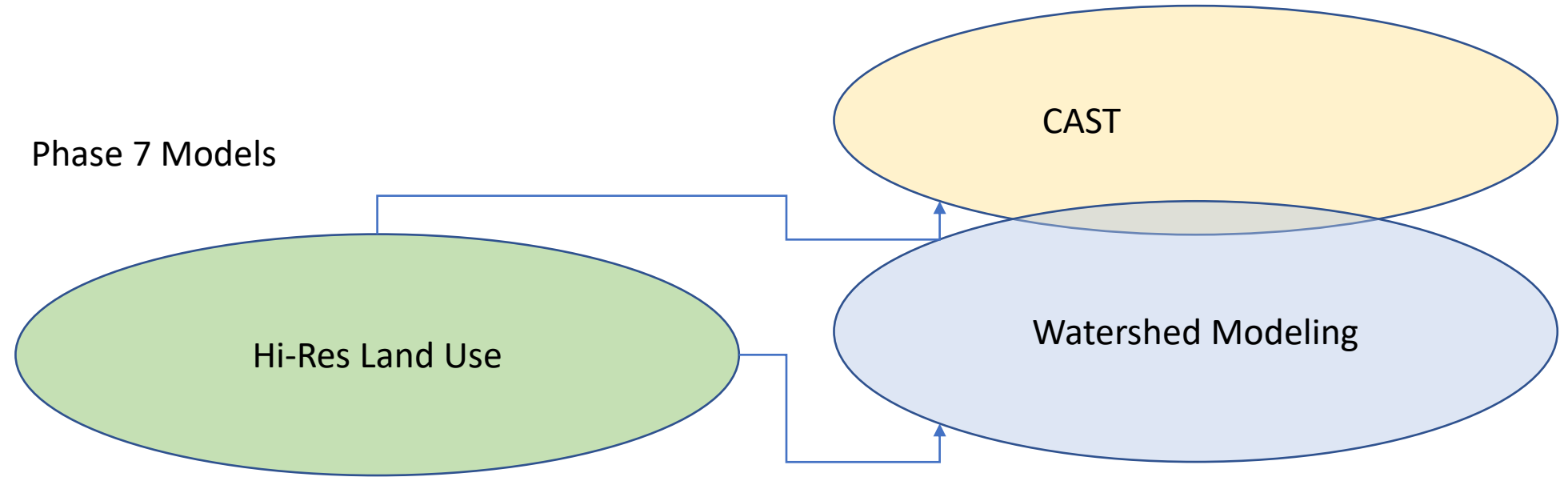
<https://cast-content.chesapeakebay.net/documents/P6ModelDocumentation%2F1%20Overview%202018%2005%2022.pdf>
https://www.chesapeakebay.net/who/group/modeling_team
<https://www.chesapeakebay.net/what/programs/modeling>



Phase 7 Development Tracks

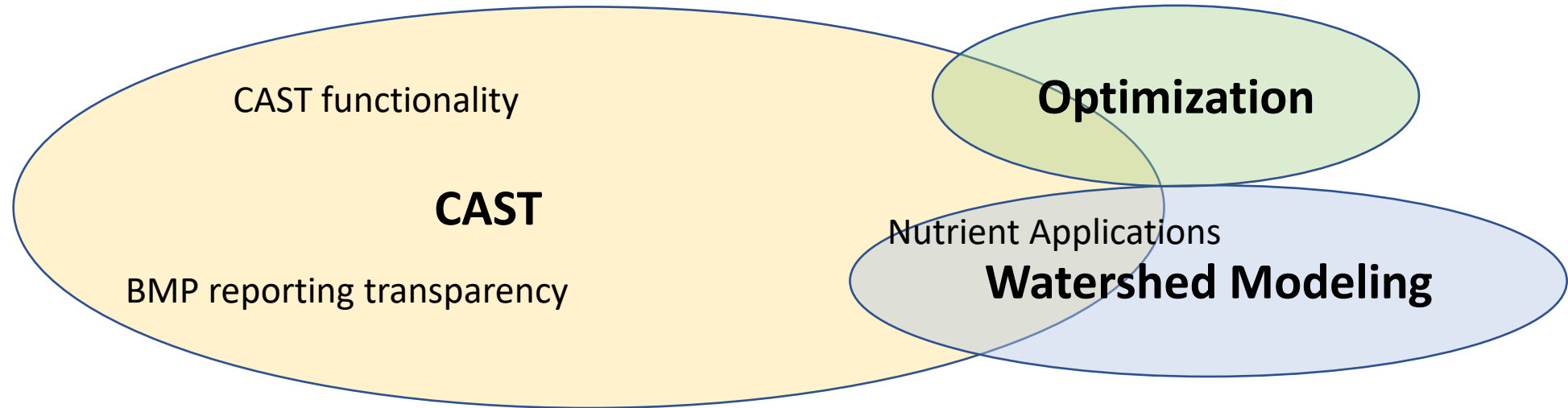


Phase 7 Development Tracks - High Res Land Use



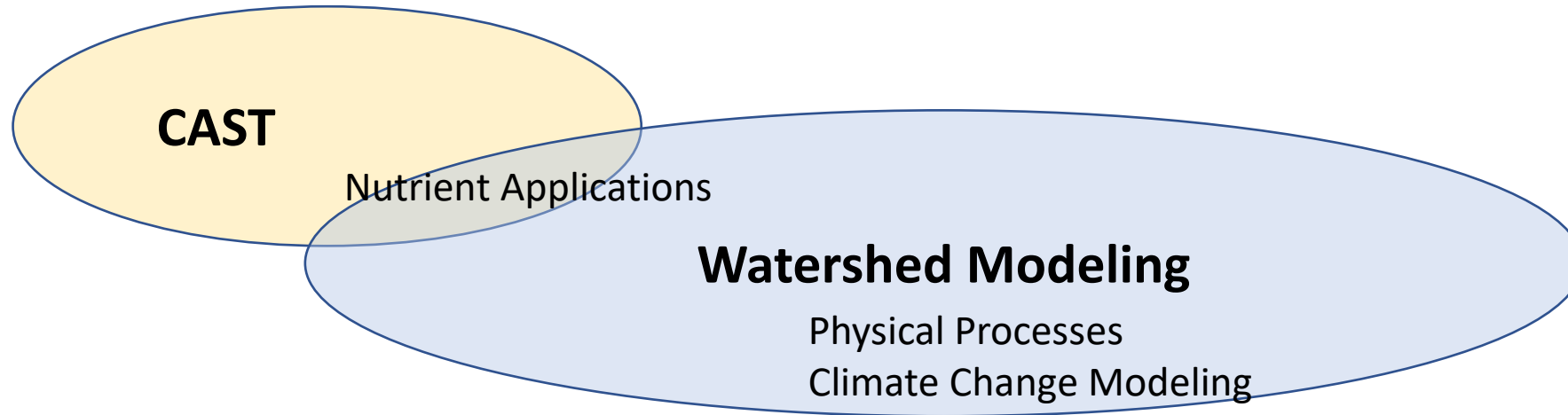
- High resolution land use products are being developed at the meter scale for delivery in 2024.
- Analysis includes fine-scale landscape and riverine features that may help predict loading rates
- *Lead – Peter Claggett*

Phase 7 Development Tracks – CAST



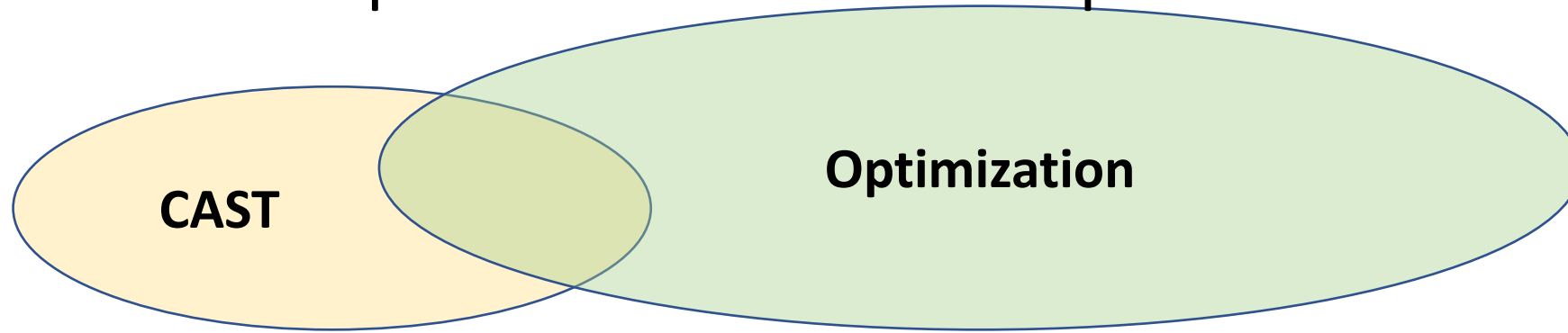
- Improve transparency and usability
- Redesign the process for submitting management practice data.
- A spatial interface to CAST will be designed to give output for a user-defined spatial extent.
- Nutrient applications will be shared with the watershed modeling track
- *Lead – Olivia Devereux*

Phase 7 Development Tracks – Watershed Modeling



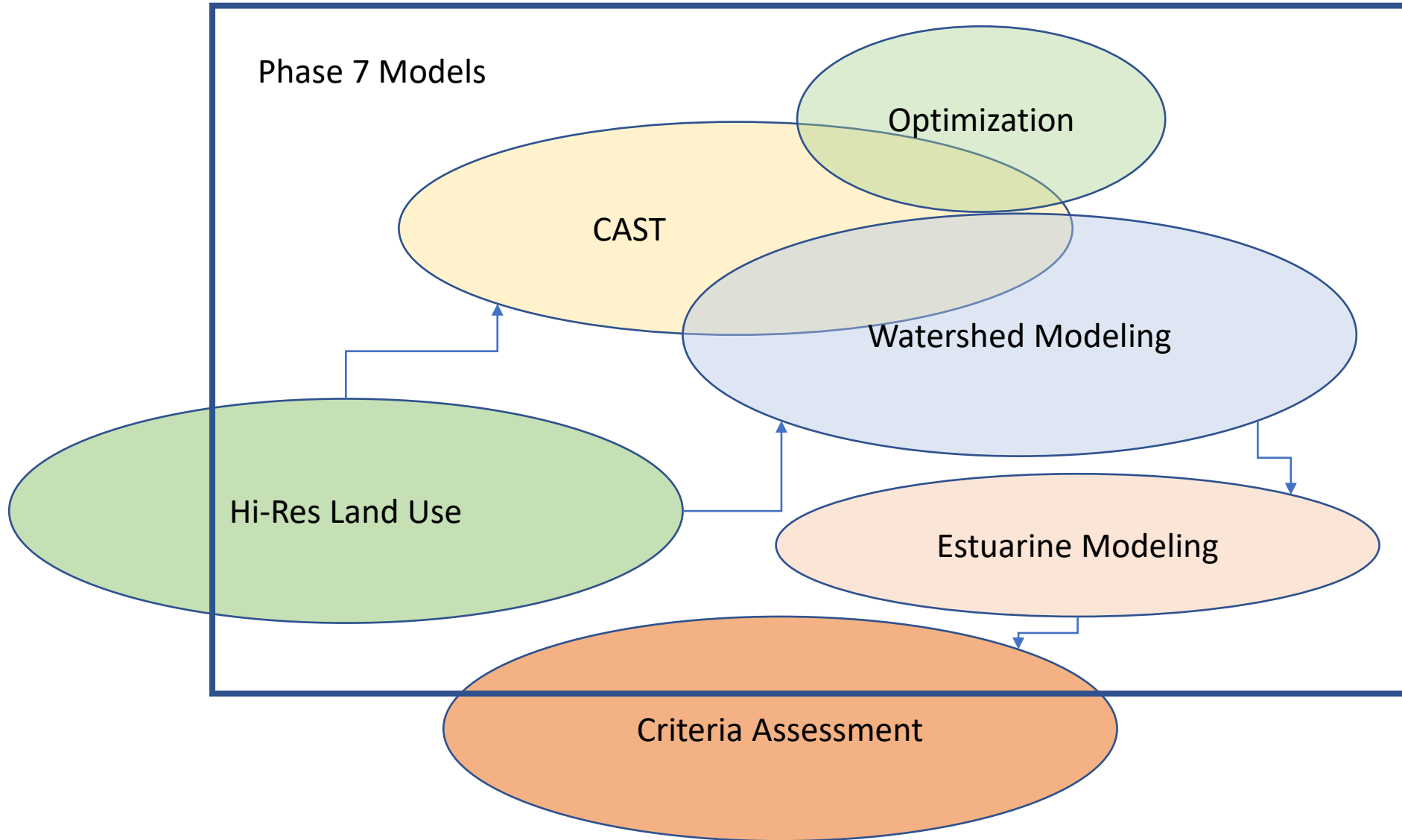
- Better representation of physical processes
- Improve climate change effect modeling
- Variable scale modeling
- Nutrient application calculations shared with CAST track
- *Lead – Gary Shenk*

Phase 7 Development Tracks - Optimization



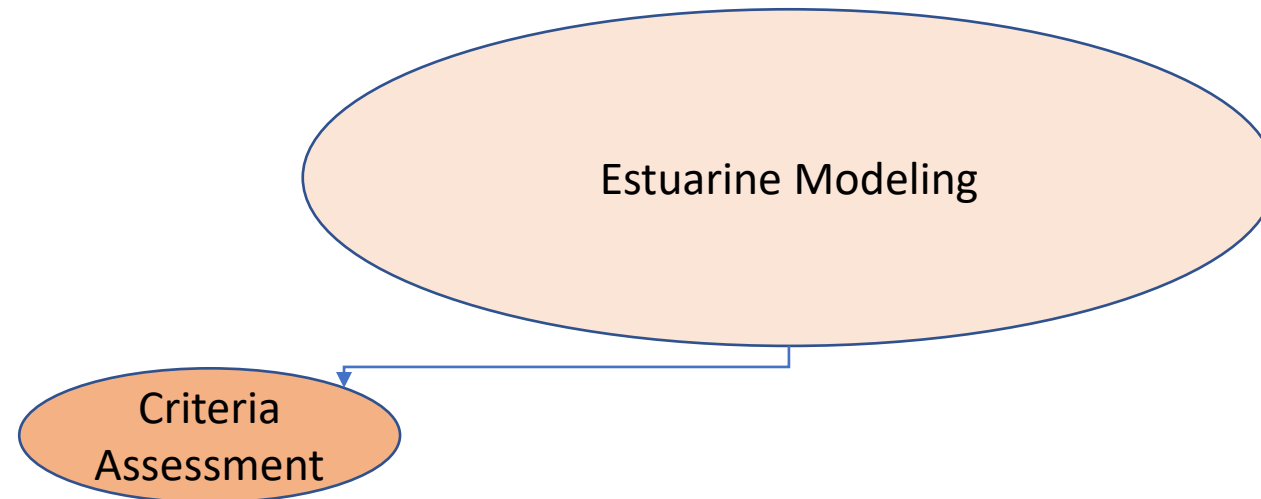
- CAST scenarios can be generated representing the least cost to achieve a desired level of nutrient and sediment reduction.
- *Lead – Lew Linker*

Phase 7 Development Tracks



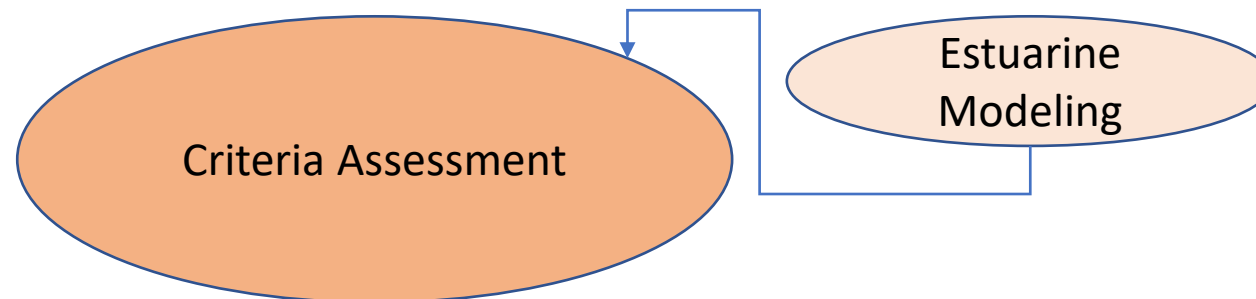
Phase 7 Development Tracks – Estuarine Modeling

- Main Bay Model being developed for entire tidal Chesapeake
- Multiple Tributary Models developed as testbeds to improve Main Bay Model
- *Lead – Lew Linker*



Phase 7 Development Tracks – Criteria Assessment

- New types of dissolved oxygen observations
- New Interpolator methods and software
- Evaluation of all criteria
- Consideration of climate change in criteria
- *Lead – Peter Tango*

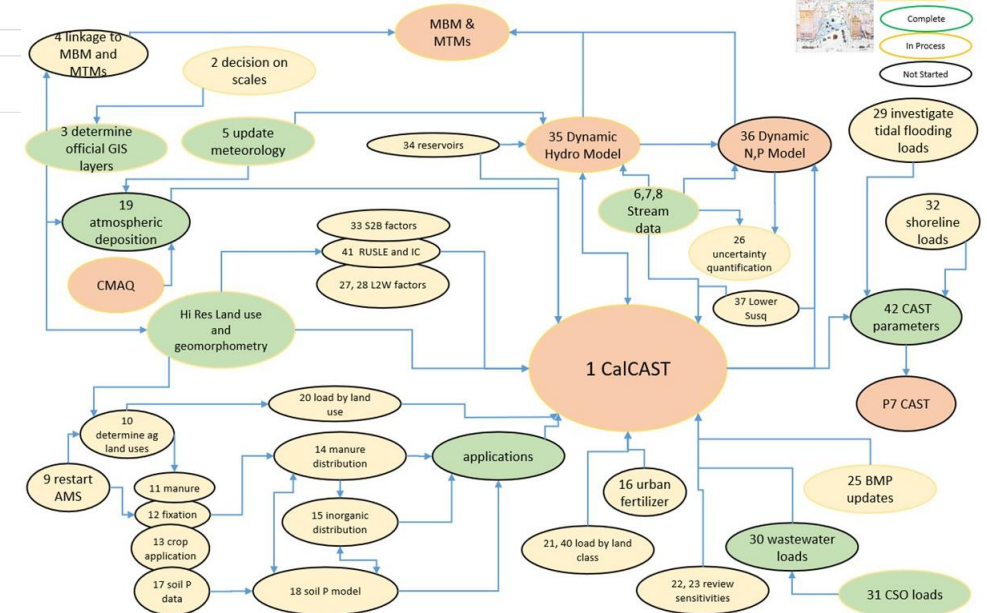


Each Track Has Provided Schedule Documents

Format will vary by Track

	2022	2022	2022	2022	2023	2023	2023	2023	2024	2024	2024	2024	2025	2025	2025	2025
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Phase 7 Activity	Work plan				Build	Work plan	Build Models				Work plan	Build Models				
General	1 Develop CalCAST using P6 data				1 Use CalCAST as primary calibration tool											
	3 Determine official CBPO GIS layers															
	5 system of annual meteorology updates															
	25 BMP updates															
	35 Dynamic model for hydrology, sediment, and temperature															
Variable Scale Modeling					29 Investigate tidal flooding loads											
									30 Update to Wastewater							
													31 Update to CSOs			

CBP Watershed Modeling Process



Item	Category	What: short description	Why: who asked for it or why is it necessary	Who is involved when the work	development time		
1	General	Develop CalCAST. CalCAST will be a tool for comparing estimated load to monitored loads given a set of inputs and parameters. It will be used in the calibration	CalCAST allows the CBP to test various data sets and strategies to see which match monitoring data best. Primary suggestion of STAC Phase 6 STAC review and Future of Modeling workshop. Allows efficient incorporation of all other development priorities	Bertani; Bhatt; Shenk	MWG	First priority. The rest of development depends on CalCAST. Need decisions on scale. 2022	A model of loads at a point is developed in Section 12 of the documentation. It will be implemented for speed of calculation with the potential to wrap parameter estimation techniques around it
2	variable scale modeling	Discuss scale and reach decision	Development of various Phase 7 tasks will benefit from knowledge of the output scale	Shenk	WQGIT, MWG	2022-2025	Presentation to WQGIT and MWG on various aspects, discussed in section 2
3	General	determine official versions of GIS layers: NHD, county, shoreline, Lrseg	Counties have updated boundaries. NHD necessary to use many important data sets, shoreline determines watershed/estuarine parameters. Lrseg may change for NHD boundaries	McDonald, Fitch, Ahmed, Bhatt	MWG	early 2022	CBPO discussions, with results to be written into section 2
4	Main bay and tributary models	physical and chemical linkage with estuarine model	Needed to run estuarine models	Bhatt	MWG	late 2022. Need to determine form of dynamic model first for the variable description.	Identify set of terminal segments. Identify estuarine cell for each terminal segment. Compare old ICM variables for the variable description. Do new WSM variables match up?

Web page

- Overview

The screenshot shows a web browser window displaying the Chesapeake Bay Program website. The page title is "Phase 7 Model Development". The header includes the Chesapeake Bay Program logo and navigation links: "Discover the Chesapeake", "Learn the Issues", "State of the Chesapeake", "Take Action", "In the News", "Who We Are", and "What We Do". The main content area features a large heading "Phase 7 Model Development" and a sub-heading "The Chesapeake Bay Program is updating its modeling and analysis tools used in the Chesapeake Bay TMDL." Below this is a list of six interrelated projects: 1. High Resolution Land Use, 2. Chesapeake Assessment Scenario Tool (CAST), 3. Optimization, 4. Watershed Modeling, 5. Estuarine Modeling, and 6. Criteria Assessment. A diagram titled "Phase 7 Models" illustrates the relationships between these projects, showing overlapping ovals for "Hi-Res Land Use", "CAST and NEIEN", "Optimization", "Watershed Modeling", and "Estuarine Modeling". A sidebar on the right lists various program areas: "Modeling", "Monitoring", "Quality Assurance", "Resource Lands Assessment", "Chesapeake Bay TMDL", "Watershed Implementation Plans", and "BMP Verification".

Phase 7 Model Development | Chesapeake Bay Program

chESAPEAKEbay.net/what/programs/modeling/phase_7_model_development

Discover the Chesapeake | Learn the Issues | State of the Chesapeake | Take Action | In the News | Who We Are | What We Do

WHAT WE DO > PROGRAMS & PROJECTS > PHASE 7 MODEL DEVELOPMENT

Phase 7 Model Development

The Chesapeake Bay Program is updating its modeling and analysis tools used in the Chesapeake Bay TMDL.

Currently in development, 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. The model, which will be ready for use by 2027, consists of six interrelated projects:

1. High Resolution Land Use
2. Chesapeake Assessment Scenario Tool (CAST)
3. Optimization
4. Watershed Modeling
5. Estuarine Modeling
6. Criteria Assessment

Phase 7 Models

Hi-Res Land Use, CAST and NEIEN, Optimization, Watershed Modeling, Estuarine Modeling

Modeling

Phase 7 Model Development

Programs & Projects

Modeling

Monitoring

Quality Assurance

Resource Lands Assessment

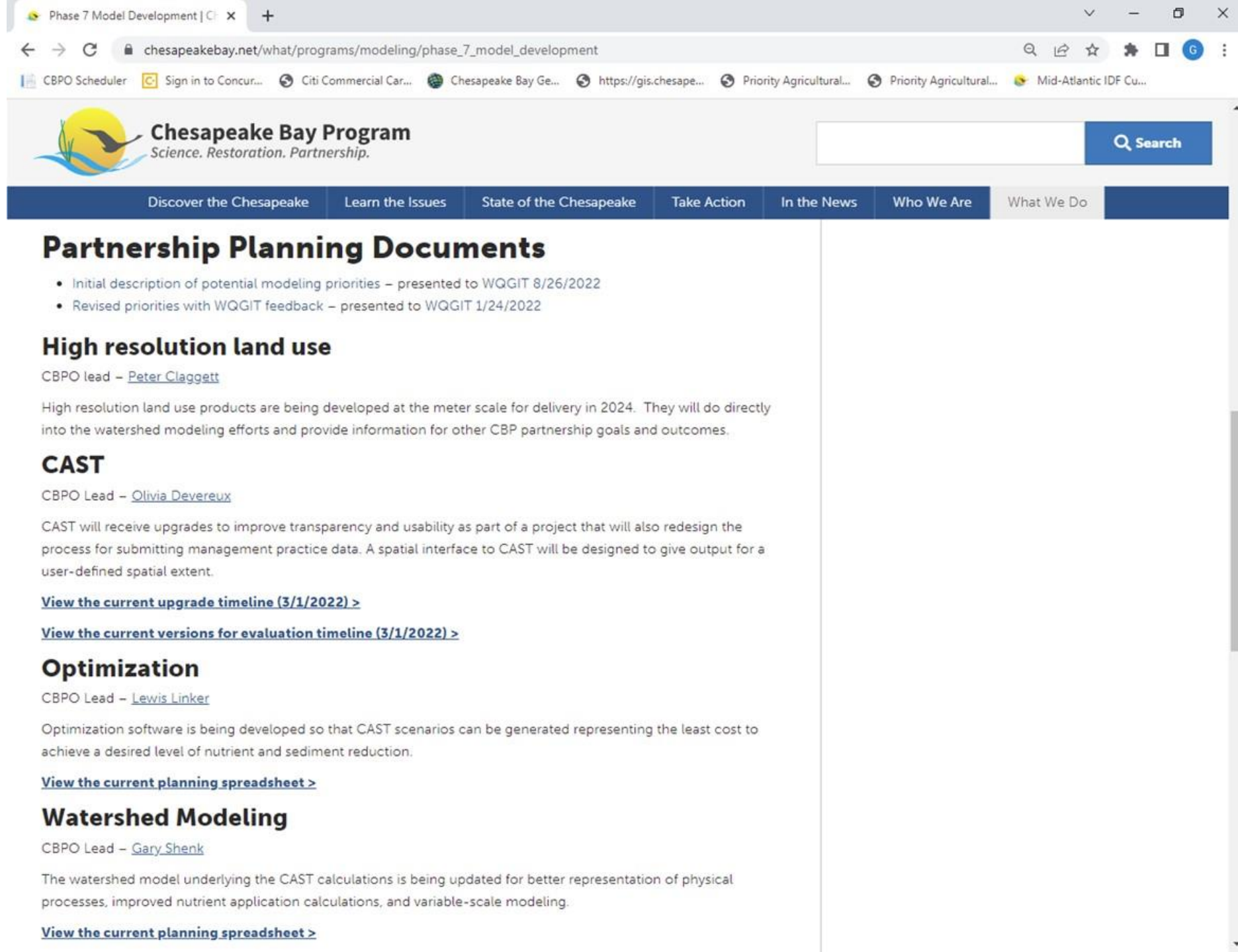
Chesapeake Bay TMDL

Watershed Implementation Plans

BMP Verification

Web page

- All six projects



The screenshot shows a web browser displaying the Chesapeake Bay Program website. The browser's address bar shows the URL: chESAPEAKEbay.net/what/programs/modeling/phase_7_model_development. The website header features the Chesapeake Bay Program logo and the tagline "Science. Restoration. Partnership." Below the header is a navigation menu with the following items: "Discover the Chesapeake", "Learn the Issues", "State of the Chesapeake", "Take Action", "In the News", "Who We Are", and "What We Do".

The main content area is titled "Partnership Planning Documents" and includes a bulleted list:

- Initial description of potential modeling priorities – presented to WQGIT 8/26/2022
- Revised priorities with WQGIT feedback – presented to WQGIT 1/24/2022

Below this is the "High resolution land use" section, which is a "CBPO lead" by Peter Claggett. It states that high resolution land use products are being developed at the meter scale for delivery in 2024.

The "CAST" section is a "CBPO Lead" by Olivia Devereux. It describes upgrades to improve transparency and usability, including a new spatial interface.

Two links are provided for the CAST section:

- [View the current upgrade timeline \(3/1/2022\) >](#)
- [View the current versions for evaluation timeline \(3/1/2022\) >](#)

The "Optimization" section is a "CBPO Lead" by Lewis Linker. It describes software development for generating CAST scenarios based on least cost to achieve nutrient and sediment reduction.

A link is provided for the optimization section:

- [View the current planning spreadsheet >](#)

The "Watershed Modeling" section is a "CBPO Lead" by Gary Shenk. It describes updates to the watershed model for better representation of physical processes and improved calculations.

A link is provided for the watershed modeling section:

- [View the current planning spreadsheet >](#)

Web page

- Linked from
 - Modeling Workgroup
 - WQGIT
 - Many WQGIT WGs

The screenshot shows a web browser window displaying the Chesapeake Bay Program website. The browser's address bar shows the URL chesapeakebay.net/who/group/modeling_team. The website header features the Chesapeake Bay Program logo and tagline "Science. Restoration. Partnership." along with a search bar. A navigation menu includes links for "Discover the Chesapeake", "Learn the Issues", "State of the Chesapeake", "Take Action", "In the News", "Who We Are", and "What We Do".

Projects and Resources

Phase 7 Model Development

The Chesapeake Bay Program is updating its modeling and analysis tools used in the Chesapeake Bay TMDL. For more information, please visit the [Phase 7 Model Development Webpage](#).

Tributary Summaries

The Chesapeake Bay Program and its partners produce tributary basin summary reports for the Bay's 12 major tributaries using tidal monitoring data from more than 130 monitoring stations throughout the mainstem and tidal portions of the Bay. These reports use water quality sample data to summarize 1) How tidal water quality (TN, TP, DO, Chlorophyll a, Secchi Depth) has changed over time, 2) How and which factors may influence water quality change over time, and 3) Recent research connecting observed changes in aquatic conditions to its drivers.

These documents can be found on the CAST webpage [here](#).

Phase 6 Climate Change Modeling Documentation

Climate Change Phase 6 Modeling Documentation (12.28 MB)

Phase 6 Watershed Model Documentation

The Final Chesapeake Bay Program Partnership Phase 6 CAST and Watershed Model documentation is posted as it becomes available. The documentation is for the time-averaged Watershed Model. CAST is the same as the Model. Creating and running scenarios in CAST is simply using an on-line interface to the Model. The documentation for the Model is the documentation for CAST. Due to the length of the documentation, it is divided into sections. Click on the links below to read through the different portions of the documentation. For more information, please visit [CAST model documentation](#).

1. [Overview](#)
2. [Average Loads](#)
 - Appendix 2A: [Agricultural Loading Rates](#)

Phase 7 Development Tracks

