Multiple Models for Management in the Chesapeake Bay: Workshop Introduction.
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This talk sought to introduce the workshop to the participants, by defining multiple modeling, listing some of its pros and cons, reviewing the genesis of the workshop, and presenting the workshop plan.

Multiple modeling involves the analysis of a set of models that make some predictions in common. Analyzing a chain of sequential models (like the current CBP suite of airshed, watershed, and estuary models) would not quality because the models do not make any shared predictions. Multiple models may be analyzed by simply comparing the models and their outputs, or the results of the multiple models might be integrated in the actual processes of decision making and environmental regulation. Types of multiple model included ensemble modeling, in which all the models make the same predictions and they are run in parallel, so that the model set together provides mean predictions and an estimate of prediction uncertainty (at a minimum, the range among model prediction). Alternatively, additional models can support a main decision model without duplicating all of its capabilities, possibly by providing multiplicity for only some of the processes, times, or areas represented in the full decision model.

Multiple modeling can provide many scientific advantages, including: comparing different hypothesis about system function, identifying areas of agreement (high confidence), identifying areas of disagreement (lower confidence), quantifying uncertainty (both prediction uncertainty and model selection uncertainty), guiding research and data collection, fostering continued synthesis and model development to improve prediction, building community among modelers, and supply knew knowledge to drive successive cycles of adaptive management.

Common objections to multiple modeling include: it costs more and requires more effort, it highlights uncertainties, it may confuse the public and decision makers, it may provoke legal challenges, and it may be incompatible with the TMDL procedures used to enforce the CWA.

There are already multiple models of the Chesapeake Bay system, such as existing USDA, USGS, and other watershed models; and other systems of linked hydrodynamic-water quality models for the Bay itself. Proactively incorporating these models into CBP decision making would make it more difficult for opponents to cite these models in challenging decisions that rely on models

In the past, STAC has recommended that the CBP apply multiple modeling to demonstrate the skill of CBP models, bolster community-wide support of the model and TMDL decisions, quantify model uncertainty, and support the claim that CBP modeling employs the "best science." In response, the CBP requested two workshops: one to explore a pilot project of shallow water hydrodynamics and water quality (described in a later talk below) and this workshop in which technical experts and stakeholders will consider how multiple modeling could be applied in the CBP.

The workshop will address multiple modeling through examination of case studies, consideration of the perceptions of models and multiple models by the public and decision makers, presentations on the possible effects of multiple modeling on legal issues in TMDL implementation, and extensive discussion. Workshop findings and recommendations will be summarized in a report prepared by STAC and delivered to the CBP.