

# Scientific and Technical Advisory Committee Chesapeake Bay Watershed Model Phase 6 Review

Zach Easton<sup>1</sup>, Don Scavia<sup>2</sup>, Richard Alexander<sup>3</sup>, Lawrence Band<sup>4</sup>, Kathleen Boomer<sup>5</sup>, Peter Kleinman<sup>6</sup>, James Martin<sup>7</sup>, Andrew Miller<sup>8</sup>, James Pizzuto<sup>9</sup>, Douglas Smith<sup>6</sup>, Claire Welty<sup>8</sup>

<sup>1</sup>Virginia Tech, <sup>2</sup>University of Michigan, <sup>3</sup>USGS, <sup>4</sup>University of North Carolina, <sup>5</sup>The Nature Conservancy, <sup>6</sup>USDA-ARS, <sup>7</sup> University of Mississippi, <sup>8</sup>University of Maryland Baltimore County, <sup>9</sup>University of Delaware

Charge



# Steady State Phase 6 Model Structure

Average Load +  $\Delta$ Inputs \* Sensitivity

\*

Land Use Acres

\*

BMPs

\*

Land to Water

\*

Stream Delivery

\*

River Delivery

Direct Loads

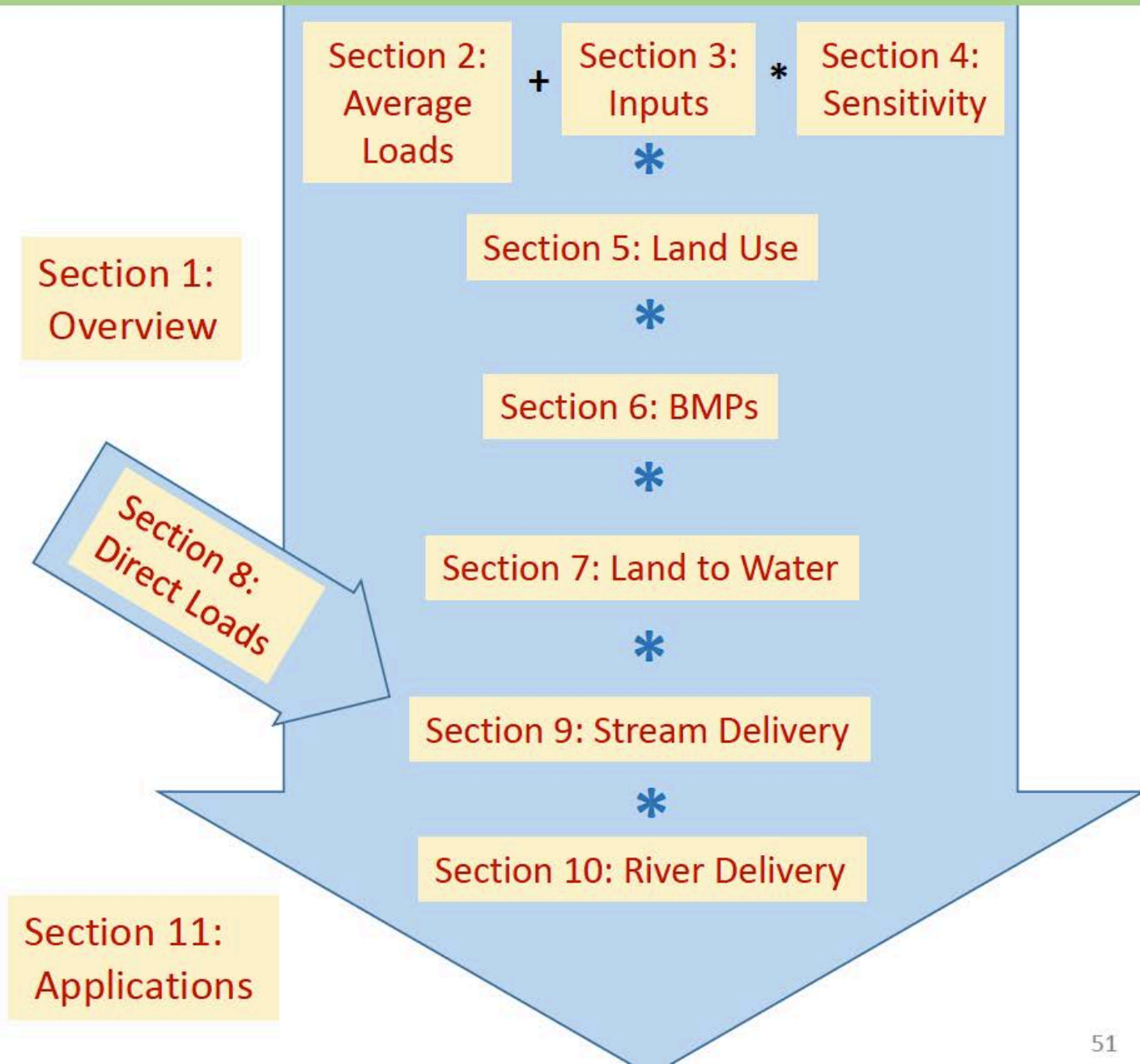
Phase 6



# Charge



## Phase 6 Model Documentation



# Major Recommendations

1. The precise role that multiple models play and the structure that is used to accommodate multiple models needs to be clarified.
2. An accuracy or skill assessment of the underlying individual models used in the multiple model approach is warranted.

# Major Recommendations

3. Begin to transition from a multi-level model approach (e.g., several models providing a single point of input to the larger watershed model, which results in a single model realization) to a true ensemble model approach, which would allow for a Bayesian model analysis and a more thorough quantification of uncertainties.
4. Related to summary recommendation 3, above, uncertainty analyses should be developed for each model component; a natural extension of the ensemble model approach.

# Major Recommendations

5. Use of expert panels for establishing BMP efficiencies should develop an explicit basis/approach to evaluating uncertainty in the estimates because this information would constitute priors for the Bayesian analysis.
6. Commit to a process for improving the model's capability to represent processes of particle transport and storage in the Chesapeake Bay watershed, as the Revised Universal Soil Loss Equation 2 (RUSLE2) foundation is questionable at the river basin scale.

# Major Recommendations

7. Begin development of sub-models that attempt to down-scale the watershed models while also exploring process-based mechanisms affecting water quality.