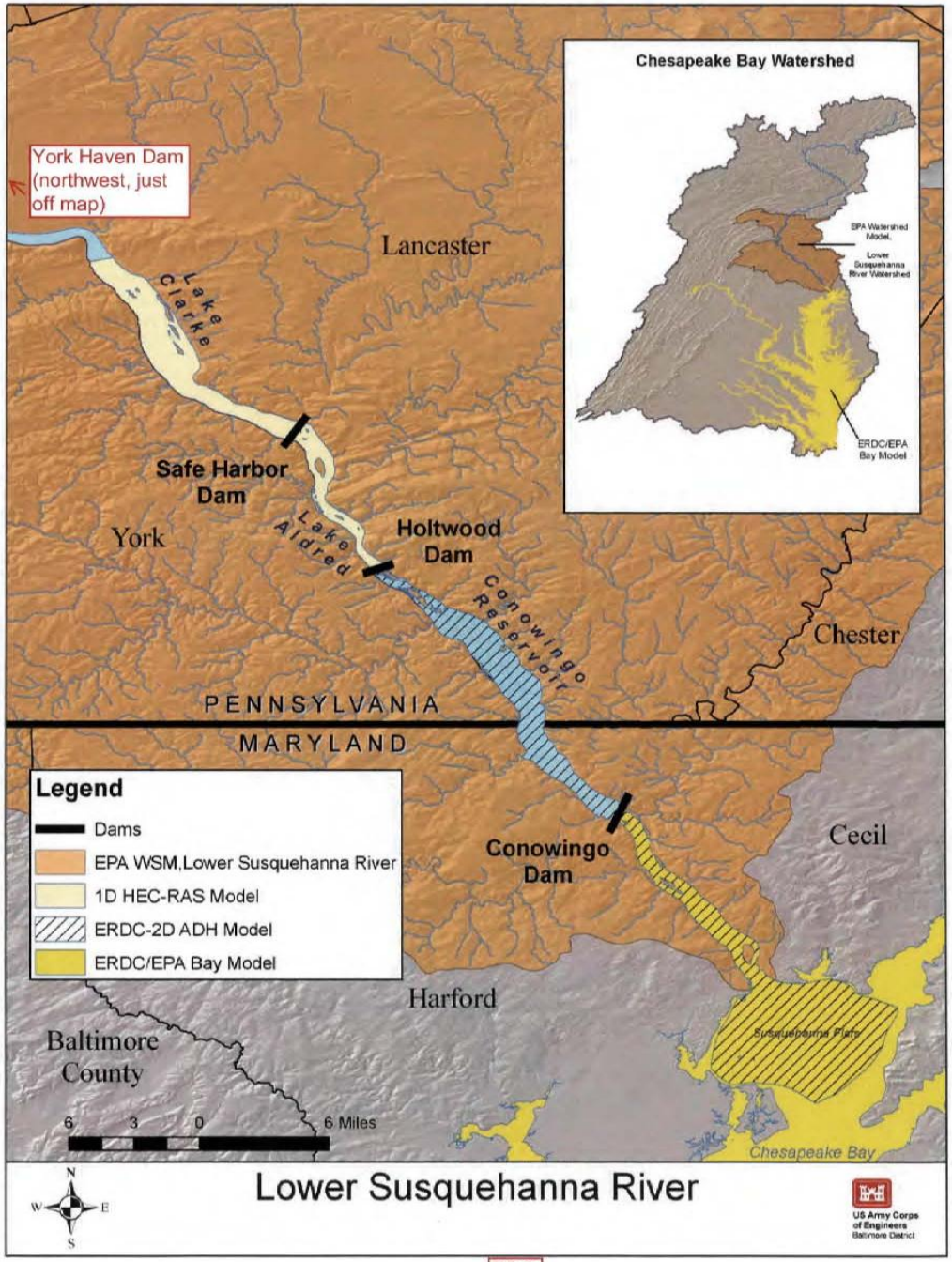
Lower Susquehanna River Watershed Assessment

- Forecast and evaluate sediment loads to the system of hydroelectric dams on the lower Susquehanna River.
- Analyze hydrodynamic and sedimentation processes within the lower Susquehanna River watershed.
- Consider structural and non-structural strategies for sediment management.
- Assess cumulative impacts of future conditions and sediment management strategies on the upper Chesapeake Bay.



ES-2

Model Approaches

- 1-D HEC-RAS Lakes Clarke and Aldred (USGS).
- 2-D ADH Conowingo Reservoir (USACE).
- 2-D ADH Susquehanna Flats (USACE).
- 3-D CE-QUAL-ICM upper Chesapeake Bay (USACE).

Key Dates

- March 2012 – Initial HEC-RAS hydraulic model.
- June 2012 – Measurements of critical shear stress in Conowingo Reservoir.
- October 2012 – Initial ADH model of Conowingo Reservoir.
- March 2013 – Commence CBEMP simulations of Chesapeake Bay.
- August 2013 – Modeling activities completed.
- October 2013 – Development of Recommendations.
- March 2014 – Draft Report.

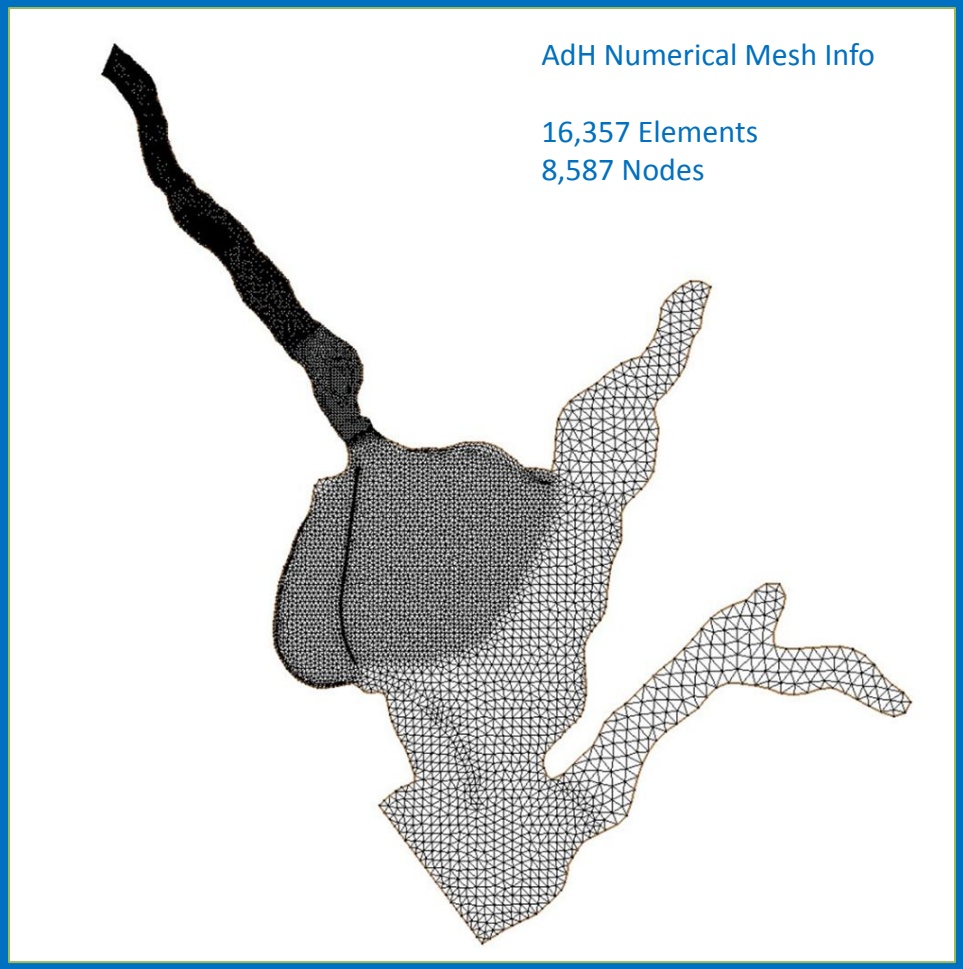
Project Status – HEC-RAS

- Conducted by Mike Langland at USGS.
- Calibration not completed as of September 6. Hydrodynamics appear OK. Sediment transport is not right.
- Experienced problems with HEC-RAS code. At the moment, problems appear to be with loads at Marietta.
- USGS and ERDC are working hard on this. Next update on October 4.

Project Status – ADH Conowingo

- Model is ready to go. Awaiting boundary conditions from HEC-RAS.

Project Status – ADH Susquehanna Flats

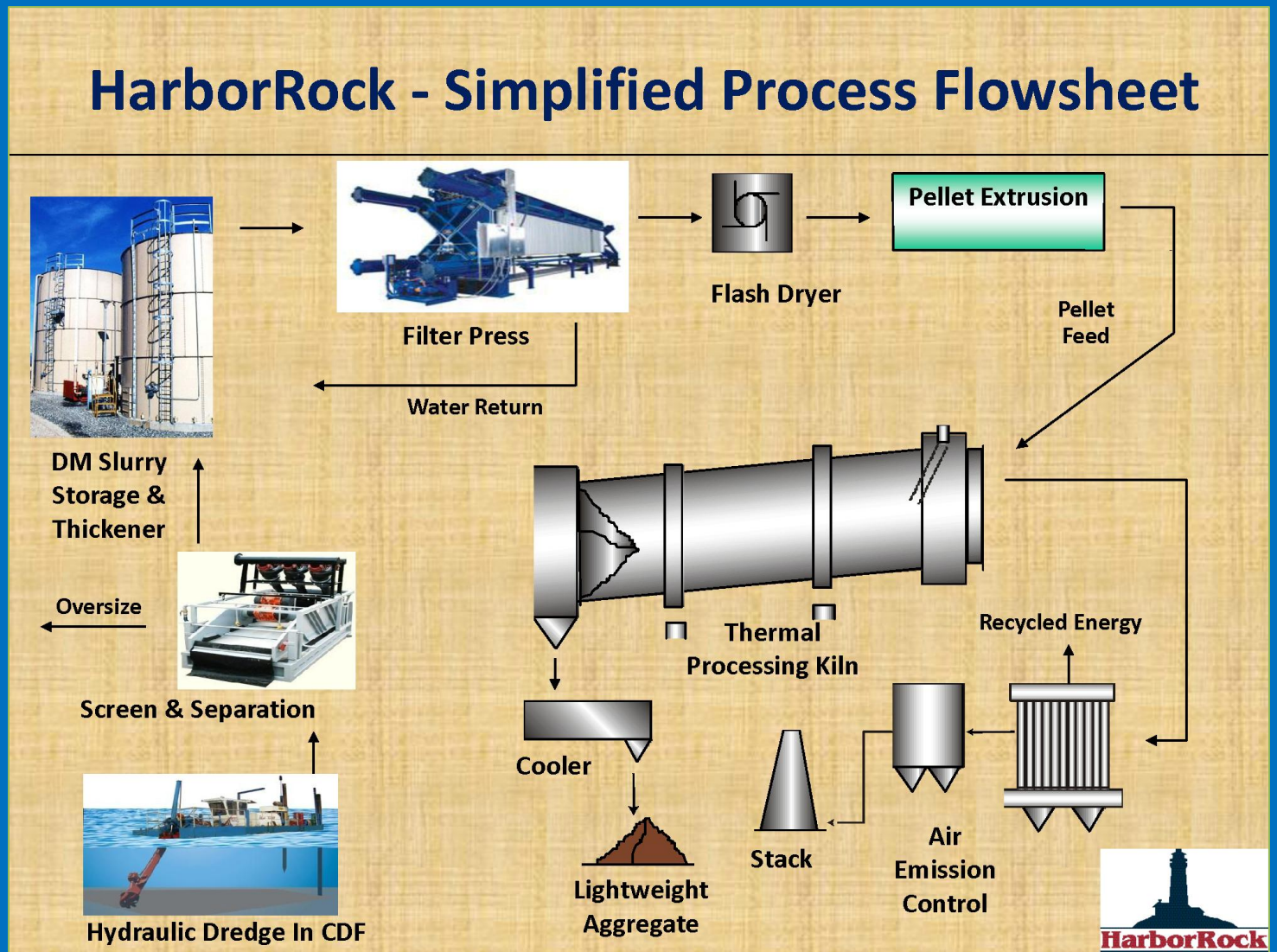


- Model is operative.
- Preliminary runs completed including Tropical Storm Lee.

Sept. 24 Brainstorming Session

- Focus on potential alternatives for sediment management.
- Group brainstorming session.
- Presentations at http://mddnr.chesapeakebay.net/lsrwa/agendas.cfm

Convert Sediments to Lightweight Aggregate



Convert Sediments to Lightweight Aggregate

Floating Islands to Remediate Conowingo Reservoir Impairments

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The ability of vegetated floating Islands to improve water quality in natural and constructed wetlands: a review

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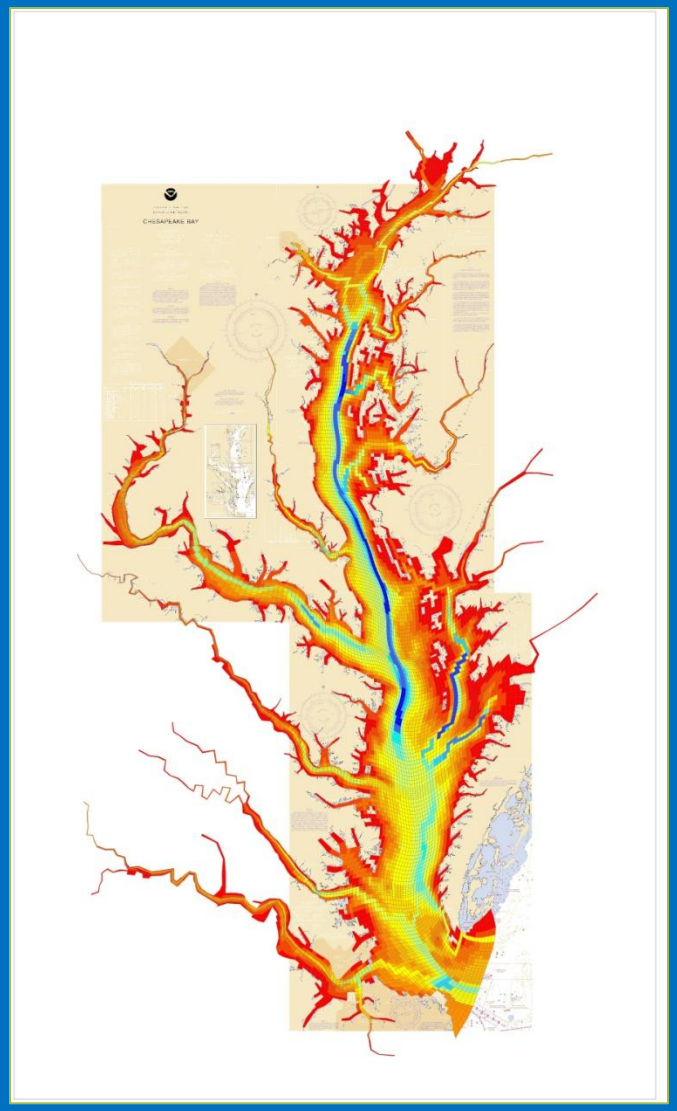
Figure 1 | FIA floating island installations at Mildura, Victoria, Australia. The two islands at rear were installed 15 months prior to the islands in foreground.

Project Status – CBEMP



- Employ the versions (WSM, WQSTM) used in the TMDL.
- We have resources for six scenarios. Consensus on first four. Two remain to be specified.
- In view of the news releases etc. regarding reservoir filling, we are urged to commence scenarios.
- We need to know from where (which model) we will obtain loads and when.

First Four Scenarios

- 2010 Progress Scenario with reservoir under existing conditions. 1991 – 2000 hydrology.
- 2010 Progress Scenario with reservoir full. 1991 – 2000 hydrology.
- TMDL Scenario with reservoir under existing conditions. 1991 – 2000 hydrology.
- TMDL Scenario with reservoir full. 1991 – 2000 hydrology.

Options for Loads - ADH

- Advantages:
  - High-resolution multi-dimensional sediment transport.
- Disadvantages:
  - Excessive run time to complete ten year scenarios.
  - Needs boundary conditions at Conowingo entrance.
  - No resources ($) on hand for this activity.
  - Some work required to merge ADH results with WSM, WQSTM.

Options for Loads – HEC-RAS

- Advantages:
  - Runs fast. Ten-year scenarios are no problem.
  - Incorporates all three reservoirs.
- Disadvantages:
  - HEC-RAS status is uncertain at the moment.
  - USGS has no commitment to produce these runs.
  - No resources ($) on hand for this activity.
  - Some work required to merge HEC-RAS results with WSM, WQSTM.

Options for Loads – EPA WSM

- Advantages:
  - Ready to go.
  - Works seamlessly with WQSTM.
- Disadvantages:
  - Some thinking, work required to deal with reservoir filling.
    - Alter bathymetry?
    - Calibrate Conowingo to resemble latest USGS findings?
    - Something else?

Two More Scenario Options

- Route 1996 winter storm through system as a late summer tropical storm.
  - Cut and paste existing hydrodynamics
  - New WSM run?
  - Explore model behavior.
- Route 1996 winter storm through system as a late-summer tropical storm with reservoir full.