

# **Toward Modeling and Analysis Tools For the 2017 Midpoint Assessment**

**Modeling Quarterly Review**  
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Lew Linker  
CBP Modeling Coordinator  
*[linker.lewis@epa.gov](mailto:linker.lewis@epa.gov)*



# Background:

**A system of models designed for the 2017 Midpoint Assessment will be applied to the last and most difficult reductions in CBP to take place from between 2017 to 2025.**

**Model refinements will be assessed on a *value added* basis for CBP decision making. Refinements should be forward-leaning in areas like water quality management by filter feeders or other innovative approaches.**

# Key Points:

- The CBP models guiding TMDL planning and implementation are well founded and fully suited to their current task.
- Nevertheless, over the last quarter century, the CBP has been committed to refinement of our watershed, estuary, and airshed analysis tools *to improve CBP decision making*.
- Refinement of the CBP modeling tools have always been oriented to *value added* development of the best available scientific tools for use by CBP decision makers.



# Principles

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- *The CBP partnership* continues to need a system of models from the *airshed*, watershed and estuary for the 2017 Midpoint Assessment.
- Management decision making needs of the 2017 Midpoint Assessment drive the process.
- The Bay Program State and Federal agencies represented *by the WQGIT, Management Board, PSC, and other CBP workgroups* implementing nutrient and sediment controls are key customers.
- Meeting model delivery deadlines are a priority.
- CBP partners are committed to continuing to improve the accuracy, utility, and reliability of the modeling effort.
- EO and EC commitments call for consideration of climate change capabilities and this needs to be part of CBP modeling tools.

James L. Malone  
Pam H. Menden  
Tom Ridge  
Anthony A. Williams  
Paul H. Brown  
Lee - Brown

# Sparrow

**Area of developable farmland converted to urban uses  
2000 - 2030**

**Legend**  
Converted Farmland  
Acres

0 - 100
101 - 224
225 - 348
349 - 472
473 - 596
597 - 720
721 - 844
845 - 968
969 - 1092
1093 - 1216
1217 - 1340
1341 - 1464
1465 - 1588
1589 - 1712
1713 - 1836
1837 - 1960
1961 - 2084
2085 - 2208
2209 - 2332
2333 - 2456
2457 - 2580
2581 - 2704
2705 - 2828
2829 - 2952
2953 - 3076
3077 - 3200
3201 - 3324
3325 - 3448
3449 - 3572
3573 - 3696
3697 - 3820
3821 - 3944
3945 - 4068
4069 - 4192
4193 - 4316
4317 - 4440
4441 - 4564
4565 - 4688
4689 - 4812
4813 - 4936
4937 - 5060
5061 - 5184
5185 - 5308
5309 - 5432
5433 - 5556
5557 - 5680
5681 - 5804
5805 - 5928
5929 - 6052
6053 - 6176
6177 - 6300
6301 - 6424
6425 - 6548
6549 - 6672
6673 - 6796
6797 - 6920
6921 - 7044
7045 - 7168
7169 - 7292
7293 - 7416
7417 - 7540
7541 - 7664
7665 - 7788
7789 - 7912
7913 - 8036
8037 - 8160
8161 - 8284
8285 - 8408
8409 - 8532
8533 - 8656
8657 - 8780
8781 - 8904
8905 - 9028
9029 - 9152
9153 - 9276
9277 - 9400
9401 - 9524
9525 - 9648
9649 - 9772
9773 - 9896
9897 - 10020
10021 - 10144
10145 - 10268
10269 - 10392
10393 - 10516
10517 - 10640
10641 - 10764
10765 - 10888
10889 - 11012
11013 - 11136
11137 - 11260
11261 - 11384
11385 - 11508
11509 - 11632
11633 - 11756
11757 - 11880
11881 - 12004
12005 - 12128
12129 - 12252
12253 - 12376
12377 - 12500
12501 - 12624
12625 - 12748
12749 - 12872
12873 - 13000
13001 - 13124
13125 - 13248
13249 - 13372
13373 - 13496
13497 - 13620
13621 - 13744
13745 - 13868
13869 - 14000
14001 - 14124
14125 - 14248
14249 - 14372
14373 - 14496
14497 - 14620
14621 - 14744
14745 - 14868
14869 - 15000
15001 - 15124
15125 - 15248
15249 - 15372
15373 - 15496
15497 - 15620
15621 - 15744
15745 - 15868
15869 - 16000
16001 - 16124
16125 - 16248
16249 - 16372
16373 - 16496
16497 - 16620
16621 - 16744
16745 - 16868
16869 - 17000
17001 - 17124
17125 - 17248
17249 - 17372
17373 - 17496
17497 - 17620
17621 - 17744
17745 - 17868
17869 - 18000
18001 - 18124
18125 - 18248
18249 - 18372
18373 - 18496
18497 - 18620
18621 - 18744
18745 - 18868
18869 - 19000
19001 - 19124
19125 - 19248
19249 - 19372
19373 - 19496
19497 - 19620
19621 - 19744
19745 - 19868
19869 - 20000
20001 - 20124
20125 - 20248
20249 - 20372
20373 - 20496
20497

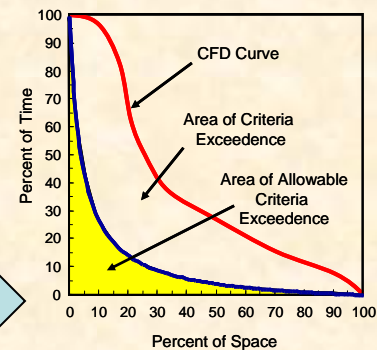
# Airshed Model

# Scenario Builder

## Watershed Model

## Bay Model

## Criteria Assessment Procedures



## Effects

# Allocations





# Next Generation CBP Models for Mid-Point 2017 Assessment

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- The outlines of a draft five year plan.
- Assumes Phase III WIPs due 2017.
- Our long-term planning for the CBP models is focused on refining the land use, watershed, airshed, and estuary/living resource models with the goal of a completely calibrated and operational suite of models by December 2015.



# Next Generation Models for Mid-Point 2017 Assessment

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The overall timeline might look something like this:

**December 2010** - Phase I WIPs published with Phase 5.3 WSM and existing Bay Model.

**December 2011** – Draft Phase II WIPs due to EPA with Phase 5.3.2 WSM and recalibrated Bay Model. March 30, 2012 – Final Phase II WIPs due to EPA.

**January 2012** - Begin post TMDL 2-year milestone tracking with Phase 5.3.2 WSM and Bay Model.

**December 2013** - Airshed Model updates planned and tracked for bi-modal  $\text{NH}_3$  & Hg and new CMAQ scenarios.

**December 2015** - Fully calibrated and operational Watershed Model and next generation Bay Model ready for analysis of Phase III WIPs.

**2016** – Jurisdictions develop Phase III WIPs with respect to what remains to be done in the final 7 years of planning (2018 -2025) to fully achieve the Bay water quality standards.

**2017** – Jurisdictions submit Phase III WIPs with 2018 - 2025 actions and controls for review and approval.

# Partnership Input Processes

- Normal BMP process for updating existing efficiencies with new research
- Issues related to inputs, land uses, BMPs, etc. will be discussed in source workgroups, WTWG, and WQGIT
- Issues of model theory, structure, and calibration will be discussed *by the Modeling Team* in the Modeling Quarterly Reviews.



# Partnership Input Processes

- *Modeling Quarterly Review – April 16-17 Annapolis Chesapeake Bay Program*
- *Chesapeake Community Modeling Program Symposium May 21-22 – Double Tree Hotel Annapolis*
- *STAC meeting on next generation shallow water model (tentative dates May 14-15 - Location TBD)*
- *Multiagency, multi-partner group is being formed as directed by the PSC and Management Board to respond to the NAS modeling laboratory recommendation. The first meeting date has yet TBD.*
- *STAC proposed workshop on multiple CBP management models to take place in late summer. The proposed workshop will discuss scientific questions on the benefits of multiple models and the opportunities and challenges in applying multiple models to CBP management.*

# Q's and A's:

- The Schedule – When will these updates happen?
  - Some aspects of the refinements can begin immediately, such as input data development for expanding model years in order to bring in more and better calibration data.
  - Other refinements will take more of a commitment and will need to be prioritized.

## Q's and A's:

- How can CBP partners suggest ideas?
  - Initially, aspects of model refinements will be developed through the technical work groups with guidance from key management workgroups like the WQGIT.
  - The Modeling Workgroup, Ag Workgroup, Urban Stormwater Workgroup, Wastewater Workgroup, Sediment Workgroup, Watershed Technical Workgroup, Modeling Quarterly Reviews, and STAC are all sources of initial ideas for next generation CBP model development.

## Q's and A's:

- Where can CBP partners go to see ideas on table?
  - A primary source of next generation CBP model ideas are the minutes from the *CBP* technical workgroups and STAC. As these initial ideas are developed they will be brought to the WQGIT for review and approval.
  - White papers that are under development will summarize ideas proposed to date.

## Q's and A's:

- How will CBP prioritize updates and proposed refinements?
  - The WQGIT will review the model refinements suggested by the technical work groups and STAC.
  - The WQGIT and the Management Board will then *consider* recommended updates and refinements of the CBP models.





# 2017 Air Model Recommendations

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- **Update the wet deposition model from current 1985-2005 to ~1980 to 2012 or beyond.**
- **Include CMAQ Model refinements of bi-directional ammonia.**
- **Develop a new 2007 emissions/meteorology base to update the current 2002 emissions/meteorology base.**
- **New library of CMAQ Scenarios of:**
  - **current conditions**
  - **2025**
  - **2030**
  - **Maximum Feasible**
- **A regional modeling center for CMAQ Scenarios of local interest linked to CBP's WSM and WQSTM.**