Applying the Decision Framework to Attaining Chesapeake Bay Water Quality Standards

Chesapeake Bay Program
A Watershed Partnership

Management Board Meeting
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Decision Framework Application

Applying the Decision Framework to Attaining Water Quality Standards in the Chesapeake Bay and Its Tidal Tributaries

CBP Water Quality Goal Implementation Team

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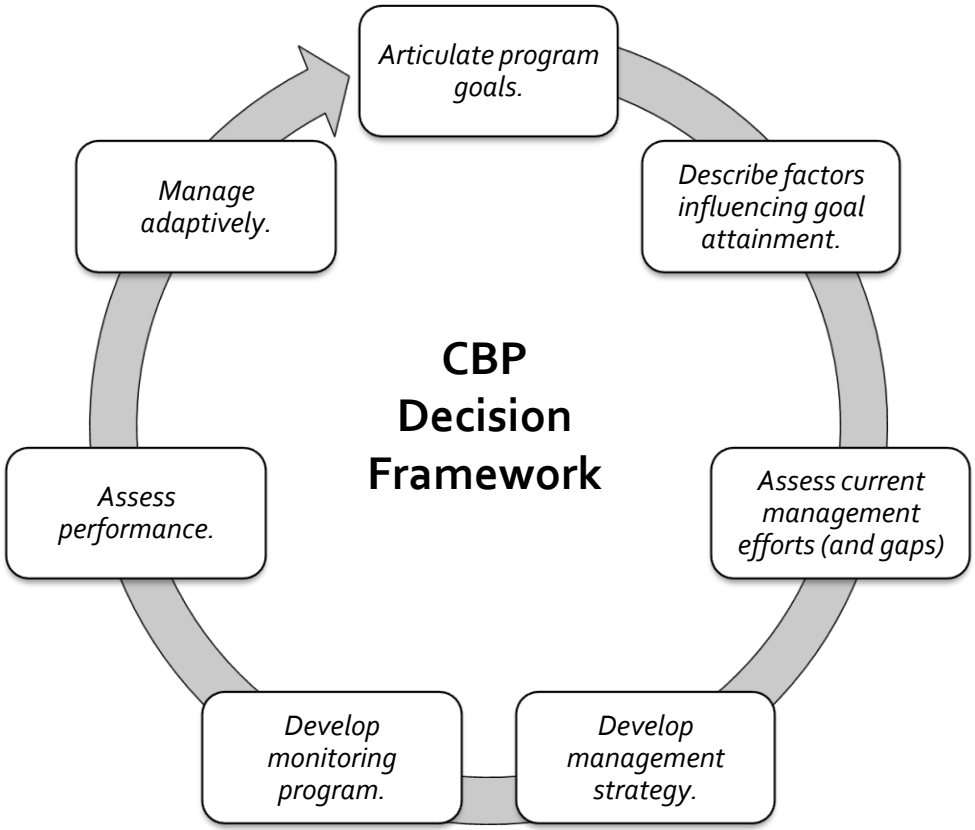
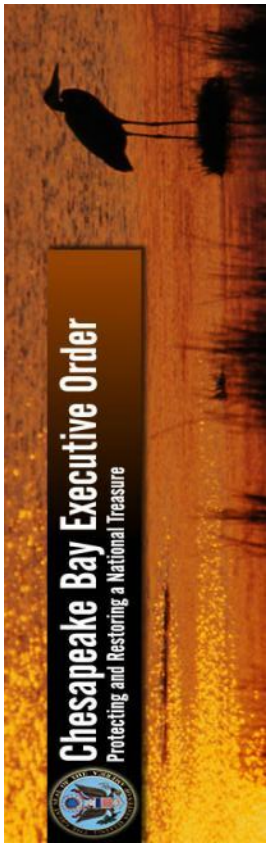


http://www.chesapeakebay.net/publications/title/applying_the_decision_framework_to_attaining_water_quality_standards_in_the

Restore Clean Water

Goal:
Reduce nitrogen, phosphorus, sediment and other pollutants to meet Bay water quality goals for dissolved oxygen, clarity, chlorophyll-a and toxic contaminants.



OUTCOMES

Water Quality Meet water quality standards for dissolved oxygen, clarity/underwater grasses and chlorophyll-a in the Bay and tidal tributaries by implementing 100 percent of pollution reduction actions for nitrogen, phosphorus and sediment no later than 2025, with 60 percent of segments attaining water quality standards by 2025. *(Current condition: 89 of the 92 segments of the Bay and its tidal waters are impaired.)*

Influencing Factors

POLLUTANT LOADS

Photos: IAN Image Library http://ian.umces.edu/imagelibrary/

MITIGATING FACTORS

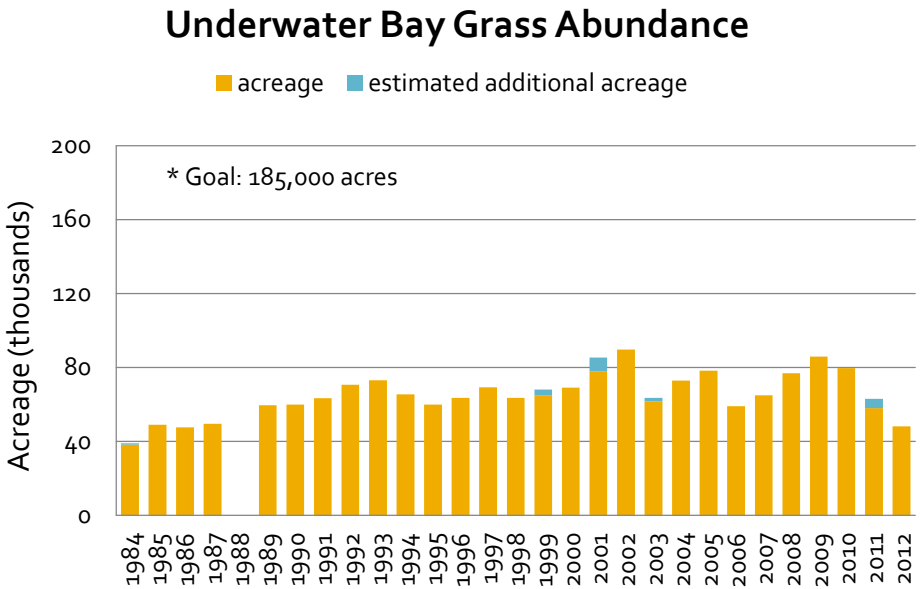
Photos: IAN Image Library http://ian.umces.edu/imagelibrary/

Influencing Factors

CLIMATE CHANGE

Photo: Chesapeake Bay Foundation http://www.cbf.org/

ECOSYSTEM RESPONSES



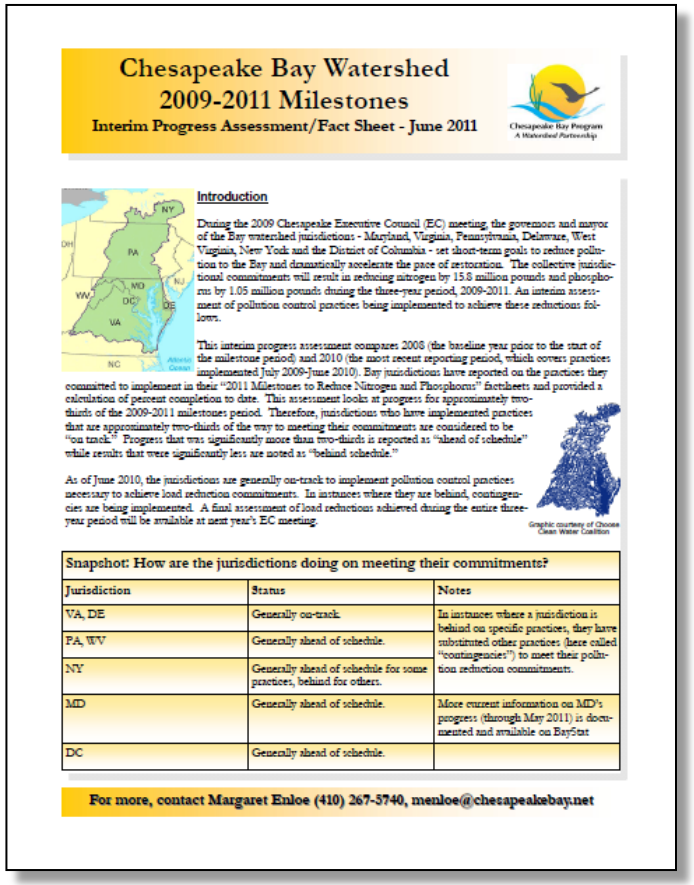
Management Efforts

BAY TMDL ALLOCATIONS

Jurisdiction	Nitrogen (-25%)	Phosphorus (-24%)	Sediment (-20%)
Pennsylvania	73.93	2.93	1983.78
Maryland	39.09	2.72	1218.10
Virginia	53.42	5.36	2578.90
District of Columbia	2.32	0.12	11.16
New York	8.77	0.57	292.96
Delaware	2.95	0.26	57.82
West Virginia	5.45	0.59	310.88
Totals	**185.93**	**12.54**	**6453.61**

Management Efforts

ACCOUNTABILITY FRAMEWORK



Chesapeake Bay Watershed
2009-2011 Milestones
Interim Progress Assessment/Fact Sheet - June 2011

Chesapeake Bay Program
A Watershed Partnership

Introduction

During the 2009 Chesapeake Executive Council (EC) meeting, the governors and mayor of the Bay watershed jurisdictions - Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York and the District of Columbia - set short-term goals to reduce pollution to the Bay and dramatically accelerate the pace of restoration. The collective jurisdictional commitments will result in reducing nitrogen by 15.8 million pounds and phosphorus by 1.05 million pounds during the three-year period, 2009-2011. An interim assessment of pollution control practices being implemented to achieve these reductions follows.

This interim progress assessment compares 2008 (the baseline year prior to the start of the milestone period) and 2010 (the most recent reporting period, which covers practices implemented July 2009-June 2010). Bay jurisdictions have reported on the practices they committed to implement in their "2011 Milestones to Reduce Nitrogen and Phosphorus" factsheets and provided a calculation of percent completion to date. This assessment looks at progress for approximately two-thirds of the 2009-2011 milestones period. Therefore, jurisdictions who have implemented practices that are approximately two-thirds of the way to meeting their commitments are considered to be "on track." Progress that was significantly more than two-thirds is reported as "ahead of schedule" while results that were significantly less are noted as "behind schedule."

Graphic courtesy of Choose Clean Water Coalition

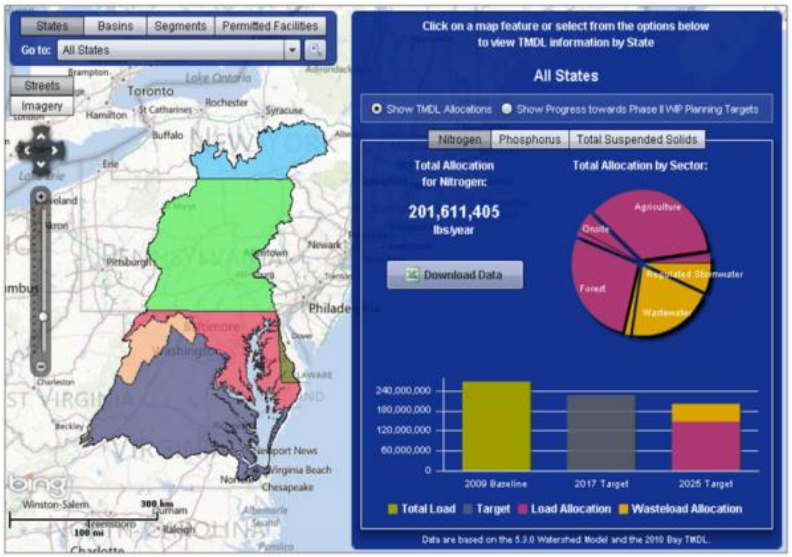
As of June 2010, the jurisdictions are generally on-track to implement pollution control practices necessary to achieve load reduction commitments. In instances where they are behind, contingencies are being implemented. A final assessment of load reductions achieved during the entire three-year period will be available at next year's EC meeting.

Snapshot: How are the jurisdictions doing on meeting their commitments?

Jurisdiction	Status	Notes
VA, DE	Generally on-track.	In instances where a jurisdiction is behind on specific practices, they have substituted other practices (here called "contingencies") to meet their pollution reduction commitments.
PA, WV	Generally ahead of schedule.	
NY	Generally ahead of schedule for some practices, behind for others.	
MD	Generally ahead of schedule.	More current information on MD's progress (through May 2011) is documented and available on BayStat
DC	Generally ahead of schedule.	

For more, contact Margaret Enloe (410) 267-5740, menloe@chesapeakebay.net

Chesapeake Bay TMDL Tracking and Accounting System



http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=2

Management Efforts

RECOGNIZED GAPS	ONGOING EFFORTS
Understanding Ecosystem Responses to Load Changes	✓ Factors Affecting Trends (FAT) ✓ Lessons Learned Report
Local Scale Load Assessments	✓ Model Phase 6
BMP Verification and Tracking	✓ Ongoing
Climate Change Effects on Existing Management Efforts	✓ Ongoing

Monitoring

- CBPO Tidal and Nontidal Monitoring Networks
- Factors Affecting Trends (FAT)
- Monitoring of desired water quality outcome and reduction goals

Assessing Performance

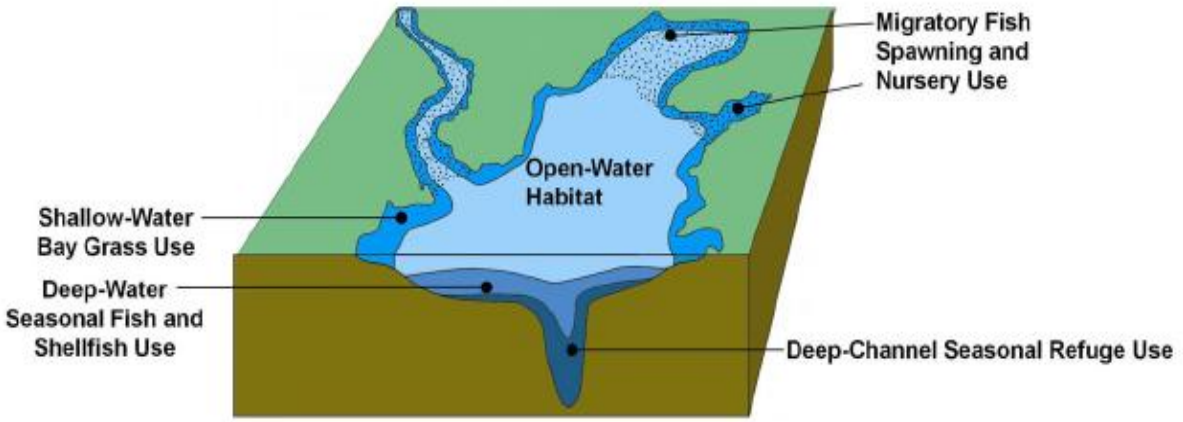
- Bay TMDL
  - 100% practices in place by 2025
- Executive Order
  - 60% of segments in attainment by 2025*
- Partnership Water Quality Indicator
  - Metric for monitoring desired outcome
  - Useful for establishing interim goals

** In tidal waters*

Water Quality Indicator

Purpose:
To measure progress toward the achievement of Chesapeake Bay water quality standards.

- 92 tidal Bay segments
- 291 designated-use segments
- Weighted, area-based approach

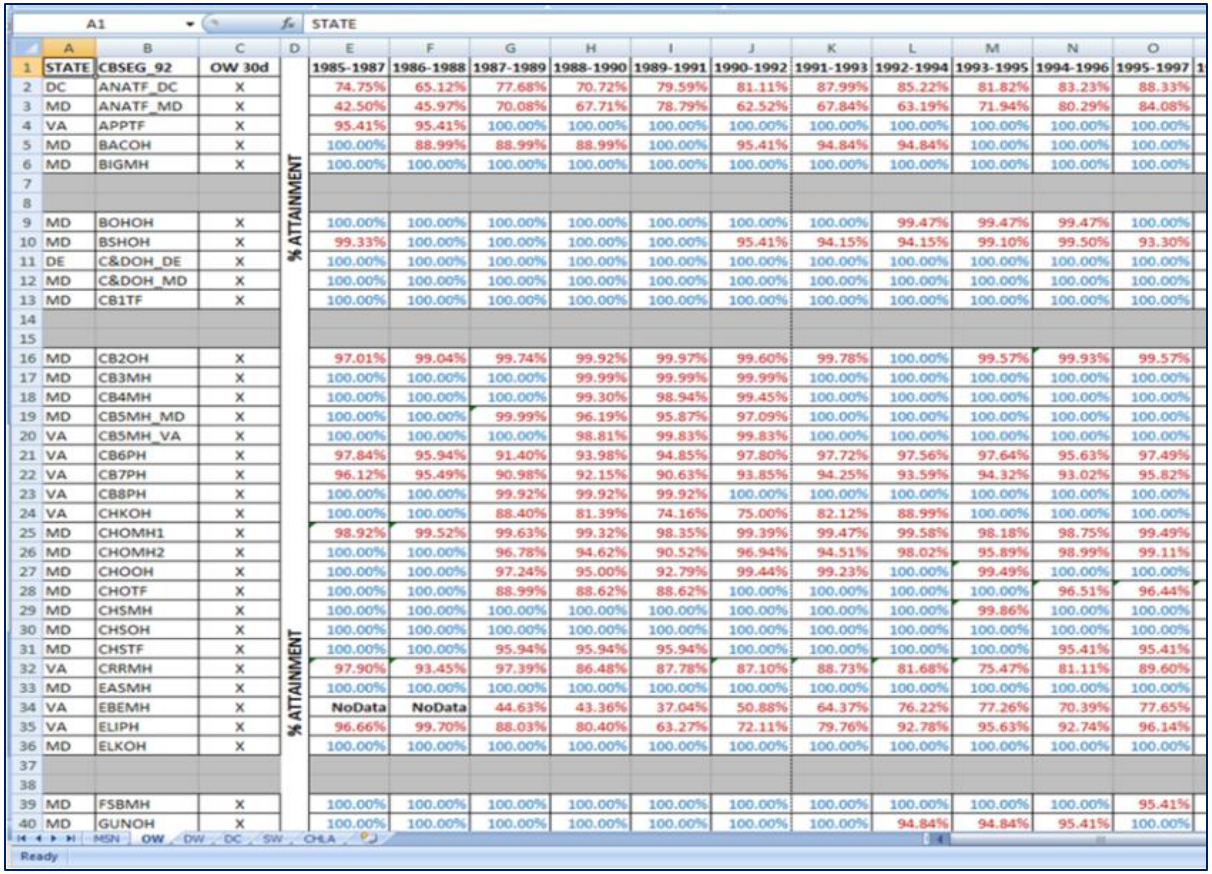


Setting Interim Expectations

- Assume validation of the umbrella criteria
  - Fully assess attainment across all segments, uses, and criteria
- Interim value based on:
  - An evaluation of the 1985-2011 time series of criteria attainment
  - Driving towards 60% attainment by 2025 as the current end point

Analyses: 1985-2011

For each designated use, developed a comprehensive spreadsheet of attainment status for the rolling 3-yr periods for each applicable segment



STATE	CBSEG_92	OW 30d		1985-1987	1986-1988	1987-1989	1988-1990	1989-1991	1990-1992	1991-1993	1992-1994	1993-1995	1994-1996	1995-1997
DC	ANATF_DC	X		74.75%	65.12%	77.68%	70.72%	79.59%	81.11%	87.99%	85.22%	81.82%	83.23%	88.33%
MD	ANATF_MD	X		42.50%	45.97%	70.08%	67.71%	78.79%	62.52%	67.84%	63.19%	71.94%	80.29%	84.08%
VA	APPTF	X		95.41%	95.41%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	BACOH	X		100.00%	88.99%	88.99%	88.99%	100.00%	95.41%	94.84%	94.84%	100.00%	100.00%	100.00%
MD	BIGMH	X	% ATTAINMENT	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	BOHOH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.47%	99.47%	99.47%	100.00%
MD	BSHOH	X		99.33%	100.00%	100.00%	100.00%	100.00%	95.41%	94.15%	94.15%	99.10%	99.50%	93.30%
DE	C&DOH_DE	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	C&DOH_MD	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	CB1TF	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	CB2OH	X		97.01%	99.04%	99.74%	99.92%	99.97%	99.60%	99.78%	100.00%	99.57%	99.93%	99.57%
MD	CB3MH	X		100.00%	100.00%	100.00%	99.99%	99.99%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	CB4MH	X		100.00%	100.00%	100.00%	99.30%	98.94%	99.45%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	CB5MH_MD	X		100.00%	100.00%	99.99%	96.19%	95.87%	97.09%	100.00%	100.00%	100.00%	100.00%	100.00%
VA	CB5MH_VA	X		100.00%	100.00%	100.00%	98.81%	99.83%	99.83%	100.00%	100.00%	100.00%	100.00%	100.00%
VA	CB6PH	X		97.84%	95.94%	91.40%	93.98%	94.85%	97.80%	97.72%	97.56%	97.64%	95.63%	97.49%
VA	CB7PH	X		96.12%	95.49%	90.98%	92.15%	90.63%	93.85%	94.25%	93.59%	94.32%	93.02%	95.82%
VA	CB8PH	X		100.00%	100.00%	99.92%	99.92%	99.92%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
VA	CHKOH	X		100.00%	100.00%	88.40%	81.39%	74.16%	75.00%	82.12%	88.99%	100.00%	100.00%	100.00%
MD	CHOMH1	X		98.92%	99.52%	99.63%	99.32%	98.35%	99.39%	99.47%	99.58%	98.18%	98.75%	99.49%
MD	CHOMH2	X		100.00%	100.00%	96.78%	94.62%	90.52%	96.94%	94.51%	98.02%	95.89%	98.99%	99.11%
MD	CHOOH	X		100.00%	100.00%	97.24%	95.00%	92.79%	99.44%	99.23%	100.00%	99.49%	100.00%	100.00%
MD	CHOTF	X		100.00%	100.00%	88.99%	88.62%	88.62%	100.00%	100.00%	100.00%	100.00%	96.51%	96.44%
MD	CHSMH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.86%	100.00%	100.00%
MD	CHSOH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	CHSTF	X	% ATTAINMENT	100.00%	100.00%	95.94%	95.94%	95.94%	100.00%	100.00%	100.00%	100.00%	95.41%	95.41%
VA	CRRMH	X		97.90%	93.45%	97.39%	86.48%	87.78%	87.10%	88.73%	81.68%	75.47%	81.11%	89.60%
MD	EASMH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
VA	EBEMH	X		NoData	NoData	44.63%	43.36%	37.04%	50.88%	64.37%	76.22%	77.26%	70.39%	77.65%
VA	ELIPH	X		96.66%	99.70%	88.03%	80.40%	63.27%	72.11%	79.76%	92.78%	95.63%	92.74%	96.14%
MD	ELKOH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD	FSBMH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	95.41%
MD	GUNOH	X		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	94.84%	94.84%	95.41%	100.00%

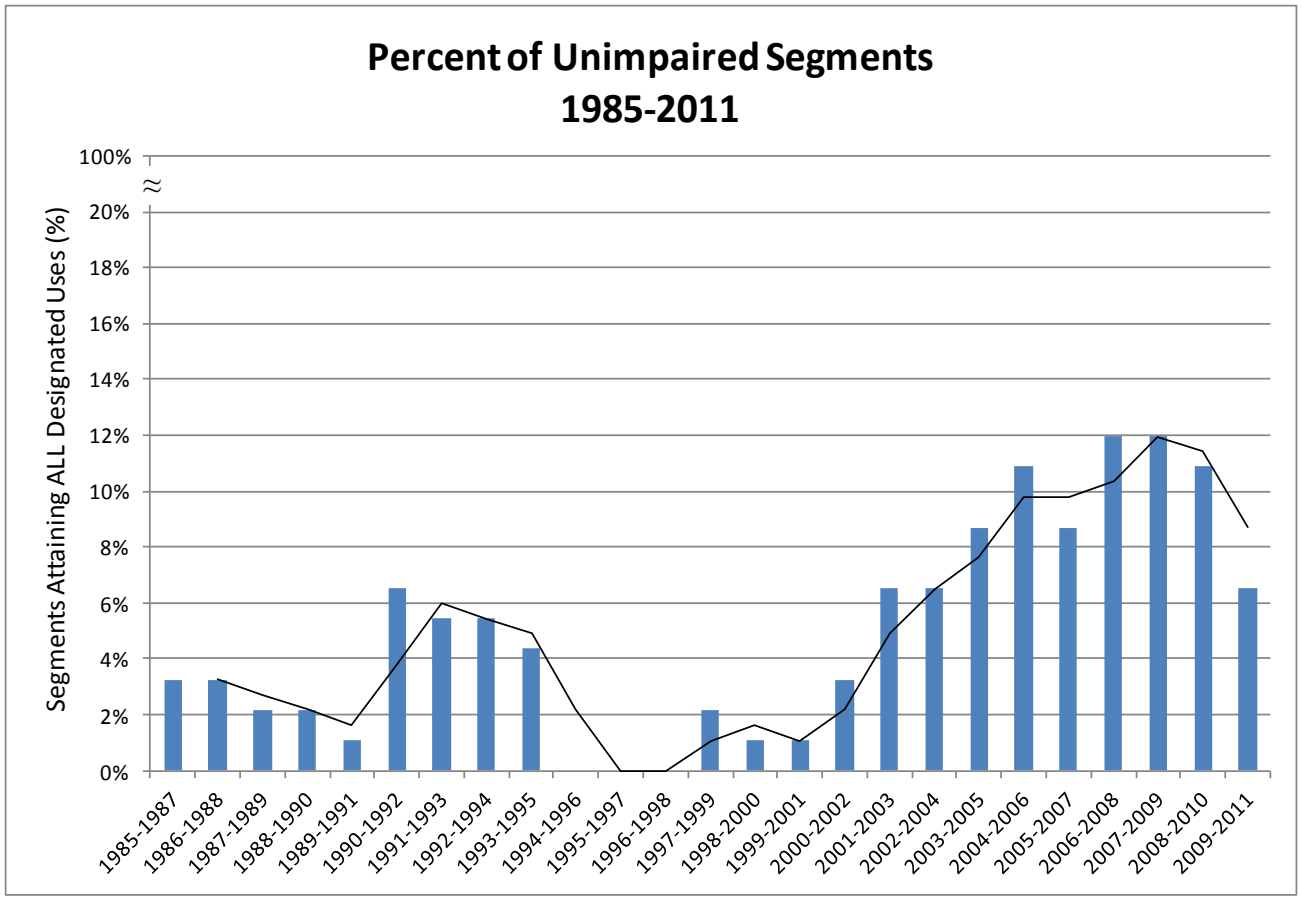
> 560,000 data points *per parameter*

Collectively:
> 28 million data points analyzed!

92 Bay Segments

Baywide:

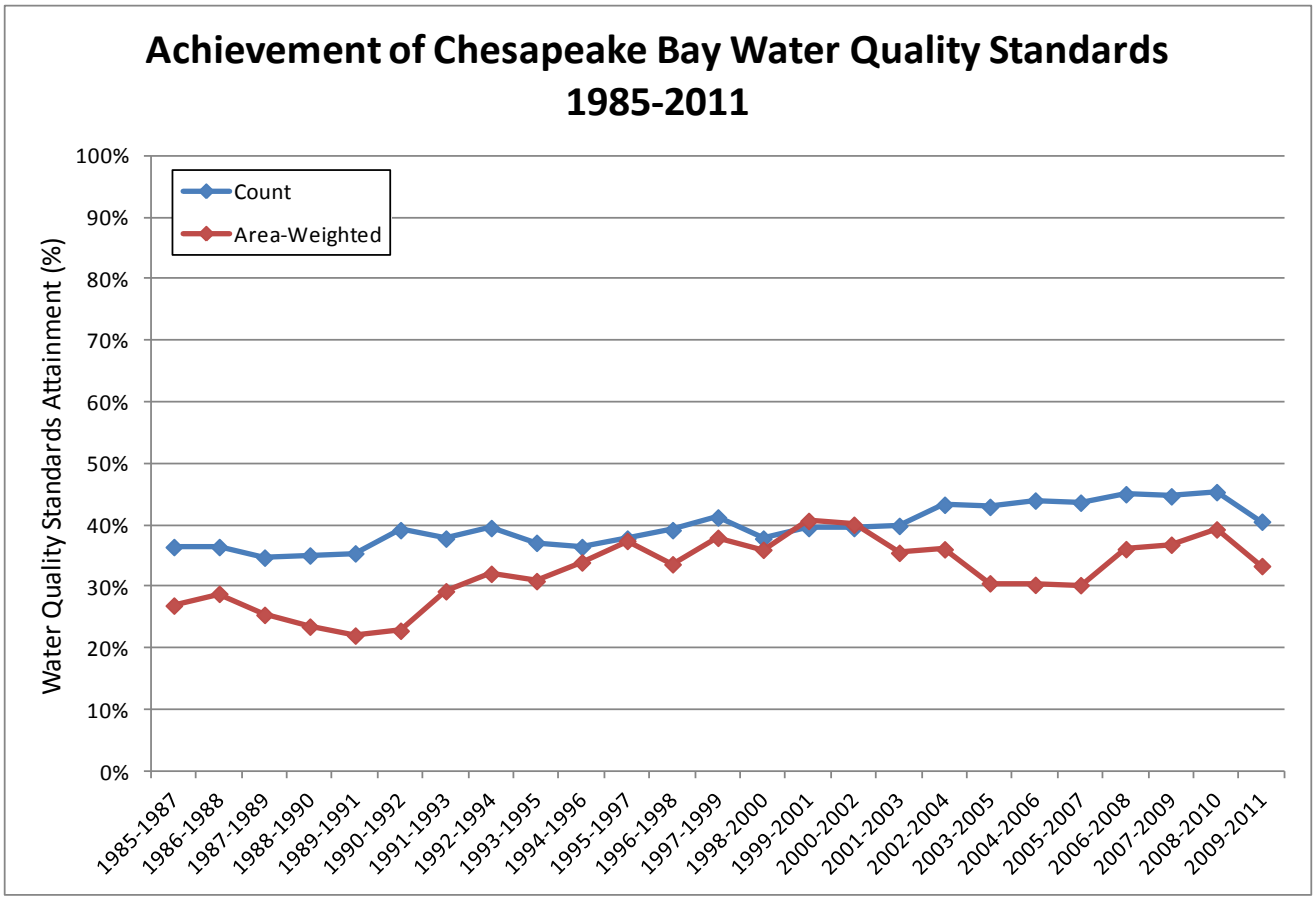
Total number of tidal Bay segments attaining all applicable designated use criteria



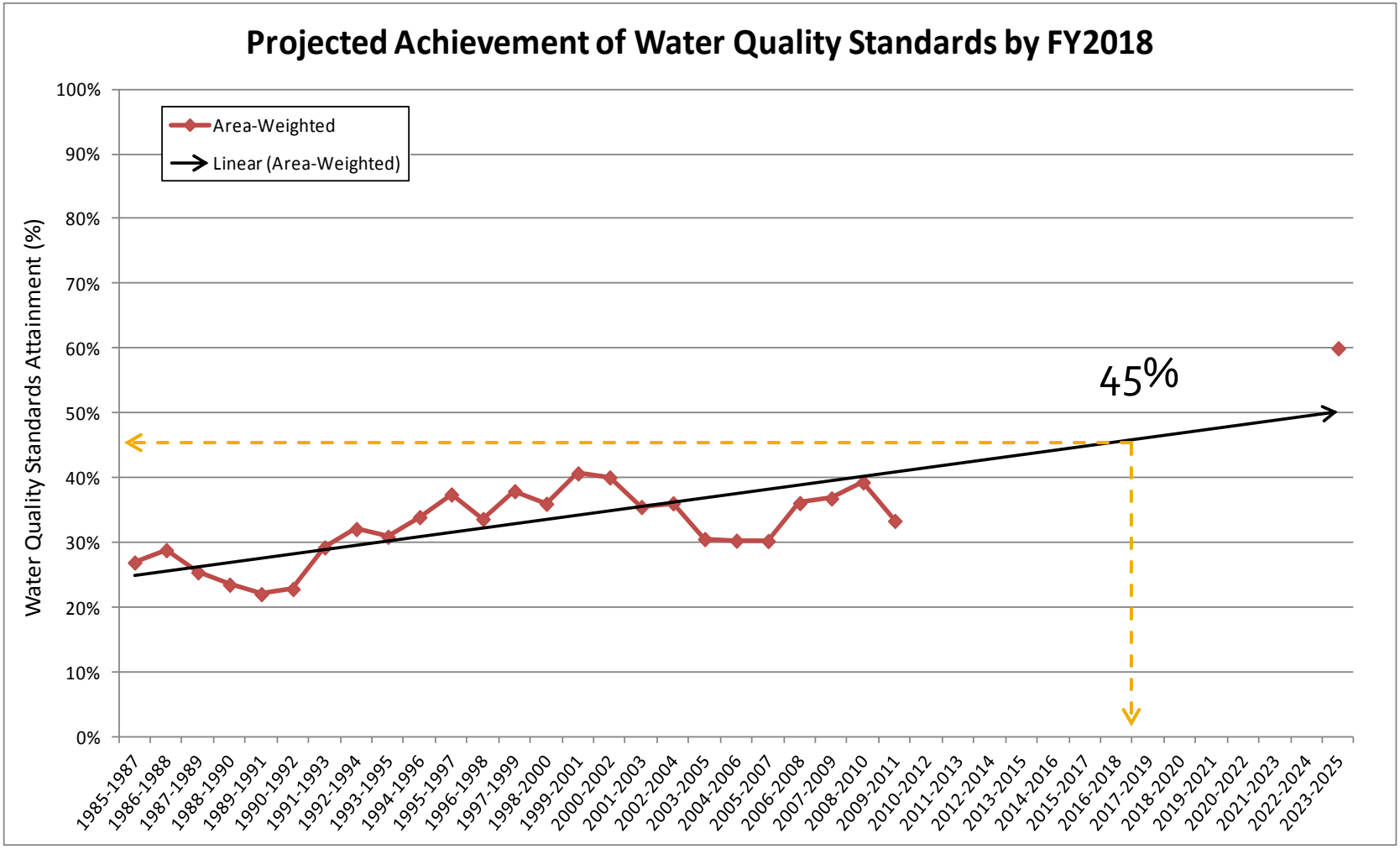
291 Designated-Use Segments

Baywide:

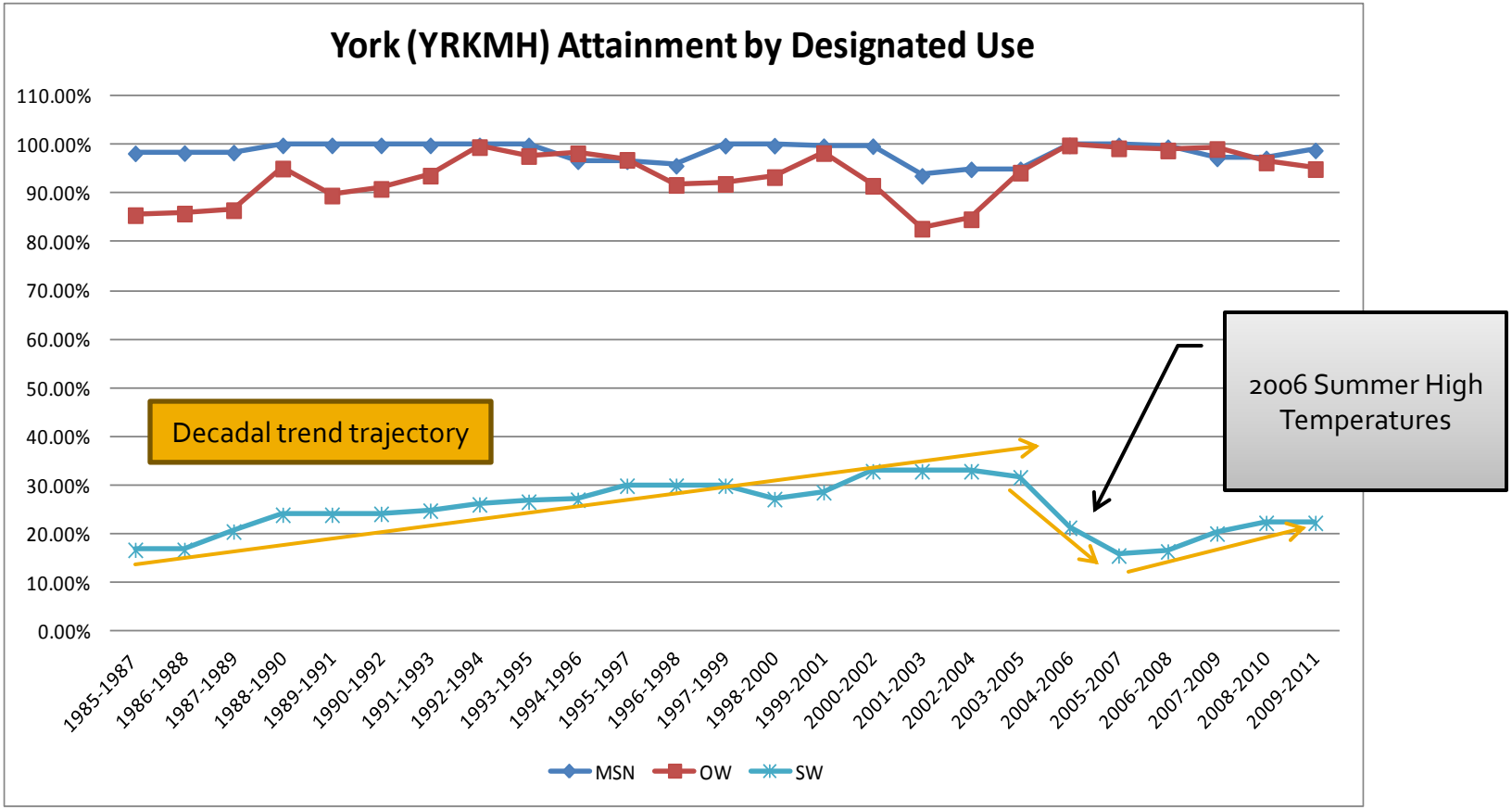
Total number of designated-use segments attaining their applicable criteria



FY2018 Target

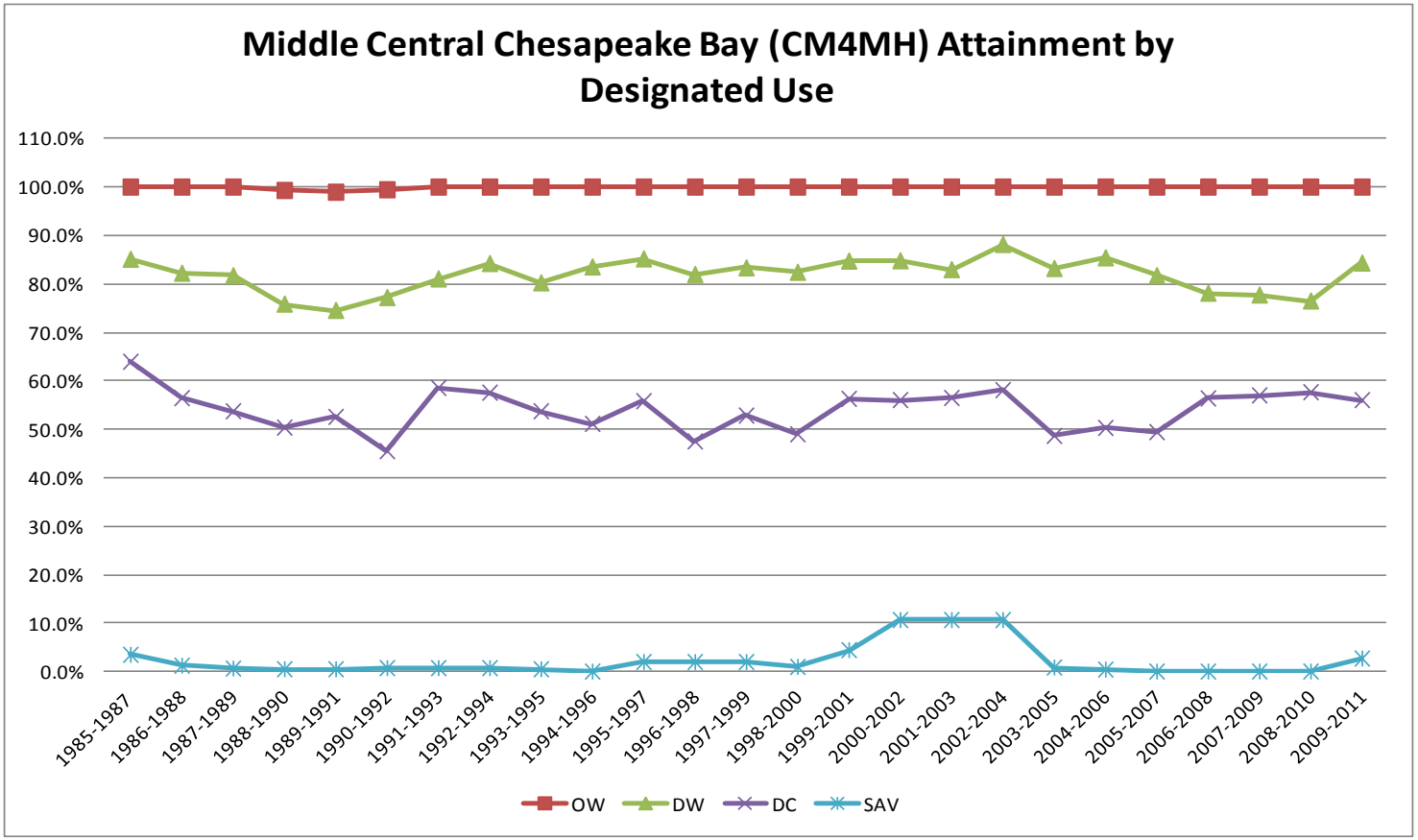


Virginia Lower York River



Improving trend in shallow-water Bay grasses WQS attainment through 2005; then 2006 summer high temperatures depleted eelgrass populations, which have yet to recover fully years later.

Middle Central Chesapeake Bay



No noticeable trends in deep water and deep channel designated use criteria attainment over time. Consistent with Bay WQ model scenario findings: need an additional 20-30+ mil. lbs more N reduction to effectively reduce abundant algal populations to enable oxygen to increase.

Continuing Efforts

- Criteria Assessment Protocols
  - Workgroup working on next criteria addendum for Partnership review, approval by 2015
- Explaining Long-term Estuarine Water Quality Trends
  - Applying recently approved assessment methodology to decades of data
  - Use Bay water quality model to forward *project* possible trajectories of water quality responses as we continue to set/work towards milestones

Adaptive Management

- What can we learn from the observed trends to feedback to our ongoing management efforts?
- Are we on track for 60% attainment of water quality standards by 2025?
- Growing evidence that we need to make informed adjustments to current efforts to ensure our goals are achieved.