Assessment of the Clarity/SAV Water Quality Standard

Water Quality Goal Implementation Team Conference Call

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Overview:

- SAV/Clarity Assessment Overview
- Use of a Critical Period
- Resolution Being Sought of Problem Segments So Far
- Getting to August 13th and Final Sediment Allocations

SAV/Clarity Assessment Overview

MD Water Quality Standards for Clarity/SAV

MD 26.08.02.03-3

.03-3 Water Quality Criteria Specific to Designated Uses.

(9) Water Clarity Criteria for Seasonal Shallow-Water Submerged Aquatic Vegetation Subcategory.

(a) Water Clarity Criteria Measurement. The attainment of the water clarity criteria for a given Bay segment can be determined using any of the following methods:

- (i) Shallow-water acreage meets or exceeds the percent-light-through-water (PLW) criteria expressed in Secchi depth equivalence (Table 1) at the segment specific application depth specified in Regulation .08 of this chapter (excludes no grow zones);
- (ii) Submerged aquatic vegetation (SAV) acreage meets or exceeds the acreage restoration goal (Table 2); or
- (iii) Shallow-water acreage meeting or exceeding the secchi depth requirements in combination with actual SAV acreage equal or exceed the SAV restoration goal acreage.

Maryland's SAV Acreage Restoration Goals and Application Depths

Segment Description[1]	Segment Designator	SAV Acreage Restoration Goal	Secchi Application Dep
Northern Chesapeake Bay	CB1TF2	12,149	2 meters
Northern Chesapeake Bay	CB1TF1	754	1.0 meters
Lower Pocomoke River Mesohaline	POCMH	877[2]	1.0 meters
Manokin River Mesohaline	MANMH1	4,294	2.0 meters
Manokin River Mesohaline	MANMH2	59	0.5 meters
Big Annemessex River Mesohaline	BIGMH1	2,021	2.0 meters
Big Annemessex River Mesohaline	BIGMH2	22	0.5 meters
Tangier Sound Mesohaline	TANMH1	24,683[2]	2.0 meters
Tangier Sound Mesohaline	TANMH2	74	0.5 meters
Middle Nanticoke River Oligohaline	NANOH	12	0.5 meters
Lower Nanticoke River Mesohaline	NANMH	3	0.5 meters
Wicomico River Mesohaline	WICMH	3	0.5 meters
Fishing Bay Mesohaline	FSBMH	197	0.5 meters
Middle Choptank River Oligohaline	CHOOH	72	0.5 meters
Lower Choptank River Mesohaline	CHOMH2	1,621	1.0 meters
Mouth of Choptank River Mesohaline	CHOMH1	8,184	2.0 meters
Little Choptank River Mesohaline	LCHMH	4,076	2.0 meters
Honga River Mesohaline	HNGMH	7,761	2.0 meters
Eastern Bay	EASMH	6209	2.0 meters
Middle Chester River Oligohaline	CHSOH	77	0.5 meters
Lower Chester River Mesohaline	CHSMH	2,928	1.0 meters
Chesapeake & Delaware (C&D) Canal	C&DOH	7	0.5 meters
Northeast River Tidal Fresh	NORTF	89	0.5 meters
Bohemia River Oligohaline	BOHOH	354	0.5 meters
Elk River Oligohaline	ELKOH1	1,844	2.0 meters
Elk River Oligohaline	ELKOH2	190	0.5 meters
Sassafras River Oligohaline	SASOH1	1,073	2.0 meters
Sassafras River Oligohaline	SASOH2	95	0.5 meters
Bush River Oligohaline	BSHOH	350	0.5 meters
Gunpowder River Oligohaline	GUNOH2	572	2.0 meters
Mouth of Gunpowder River	GUNOH1	1,860	0.5 meters
Middle River Oligohaline	MIDOH	879	2.0 meters
Patapsco River Mesohaline	PATMH	389	1.0 meters
Magothy River Mesohaline	MAGMH	579	1.0 meters
Severn River Mesohaline	SEVMH	455	1.0 meters
South River Mesohaline	SOUMH	479	1.0 meters
Rhode River Mesohaline	RHDMH	60	0.5 meters
West River Mesohaline	WSTMH	238	0.5 meters
Upper Patuxent River Tidal Fresh	PAXTF	205	0.5 meters
Middle Patuxent River Oligohaline	PAXOH	115	0.5 meters
Lower Patuxent River Mesohaline	PAXMH1	1,459	2.0 meters
Lower Patuxent River Mesohaline	PAXMH2	172	0.5 meters
Lower Patuxent River Mesohaline	PAXMH4	1	0.5 meters
Lower Patuxent River Mesohaline	PAXMH5	2	0.5 meters
Lower Potomac River Tidal Fresh	POTTF	2,142[2]	2.0 meters
Piscataway Creek Tidal Fresh	PISTF	789	2.0 meters
Mattawoman Creek Tidal Fresh	MATTF	792	1.0 meters
Lower Potomac River Oligohaline	POTOH1	1,387[2]	2.0 meters
Lower Potomac River Oligohaline	POTOH2	262	1.0 meters
Lower Potomac River Oligohaline	POTOH3	1,153	1.0 meters
Lower Potomac River Mesohaline	POTMH	7,088[2]	1.0 meters
Upper Chesapeake Bay	CB2OH	705	0.5 meters
Upper Central Chesapeake Bay	CB3MH	1,370	0.5 meters
Middle Central Chesapeake Bay	CB4MH	2,533	2.0 meters
Lower Central Chesapeake Bay	CB5MH	8,270[2]	2.0 meters

[1] The segments Middle Pocomoke Oligohaline (POCOH-application depth = 0.5 meters), Upper Chester River Tidal Fresh (CHSTF-application depth = 0.5 meters), Back River Oligohaline (BACOH-application depth = 0.5 meters), and West Branch Patuxent River (WBRTF-application depth = 0.5 meters), and Lower Patuxent River Mesohaline Subsegments 3 and 6 (PAXMH3 & PAXMH6-application depths = 0.5 meters), and the Anacostia River Tidal Fresh (ANATF-application depth = 0.5 meters) are not listed above because the SAV Restoration goal for each segment is 0 acres, based on the required historical SAV presence criteria used to set the restoration goal for each segment. These segments have been assigned a water clarity criteria and application depth. Attainment of the shallow-water designated use will be determined using the method outlined in §C(9)(a)(i)—(iii) and (c) of this regulation.

From Maryland's Water Quality Standards:

(b) Table 1. Numerical Water Clarity Criteria (in Secchi Depth equivalents) for General Application to Shallow Water Aquatic Vegetation Bay Grass Designated Use (Application Depths Given in 0.5 Meter Attainment Intervals[1]).

Salinity Regime	Water Clarity Criteria as Percent Light through Water	Water Clarity Criteria as Secchi Depth (meters) / Water Clarity Criteria Application Depths (meters)				Seasonal Application
		0.5	1.0	1.5	2.0	
		Secchi Depth Equivalents for Criteria Application Depth				
Tidal Fresh	13%	0.4	0.7	1.1	1.4	April 1 to October 1
Oligohgaline	13%	0.4	0.7	1.1	1.4	April 1 to October 1
Mesohaline	22%	0.5	1.0	1.4	1.9	April 1 to October 1

[1]Based on application f the formula PLW = 100exp($-K_d Z$), the appropriate PLW criterion value and the selected application depth (Z) are inserted and the equation is solved for K_d. The generated K_d value is then converted to Secchi depth (in meters) using the conversion factor K_d = 1.45/Secchi depth.

VA Water Quality Standards for Clarity/SAV

9 VAC 25-260 March 2005

B. Submerged Aquatic Vegetation and Water Clarity
If the submerged aquatic vegetation (SAV) acres in this subsection are met in any individual Chesapeake Bay Program segment as described in subsection D of this section, then the shallow-water submerged aquatic vegetation use is met in that segment. If the SAV acres in this subsection are not met in any individual Chesapeake Bay Program segment, then the water clarity criteria shall apply to the water clarity acres in that segment. If these water clarity criteria are met to the bottom water-sediment interface for the number of water clarity acres in that segment, then the shallow-water submerged aquatic vegetation use is met; regardless of the number of acres of SAV in that segment.

Designated Use	Chesapeake Bay Program Segment	SAV Acres[1]	Water Clarity Criteria (percent light-through-water)[2]	Water Clarity Acres[1]	Temporal Application
Shallow-Water Submerged Aquatic Vegetation Use	CB5MH	7,633	22%	14,514	April 1 - October 31
	CB6PH	1,267	22%	3,168	March 1 - November 30
	CB7PH	15,107	22%	34,085	March 1 - November 30
	CB8PH	11	22%	28	March 1 - November 30
	POTTF	2,093	13%	5,233	April 1 - October 31
	POTOH	1,503	13%	3,758	April 1 - October 31
	POTMH	4,250	22%	10,625	April 1 - October 31
	RPPTF	66	13%	165	April 1 - October 31
	RPPOH	0	-	0	-
	RPPMH	1700	22%	5000	April 1 - October 31
	CRRMH	768	22%	1,920	April 1 - October 31
	PIAMH	3,479	22%	8,014	April 1 - October 31
	MPNTF	85	13%	213	April 1 - October 31
	MPNOH	0	-	0	-
	PMKTF	187	13%	468	April 1 - October 31
	PMKOH	0	-	0	-
	YRKMH	239	22%	598	April 1 - October 31
	YRKPH	2,793	22%	6,982	March 1 - November 30
	MOBPH	15,901	22%	33,990	March 1 - November 30
	JMSTF2	200	13%	500	April 1 - October 31
	JMSTF1	1000	13%	2500	April 1 - October 31
	APPTF	379	13%	948	April 1 - October 31
	JMSOH	15	13%	38	April 1 - October 31
	CHKOH	535	13%	1,338	April 1 - October 31
	JMSMH	200	22%	500	April 1 - October 31
	JMSPH	300	22%	750	March 1 - November 30
	WBEMH	0	-	0	-
	SBEMH	0	-	0	-
	EBEMH	0	-	0	-
	LAFMH	0	-	0	-
	ELIPH	0	-	0	-
	LYNPH	107	22%	268	March 1 - November 30
	POCOH	0	-	0	-
	POCMH	4,066	22%	9,368	April 1 - October 31
	TANMH	13,579	22%	22,064	April 1 - October 31

1 = The assessment period for SAV and water clarity acres shall be the single best year in the most recent three consecutive years. When three consecutive years of data are not available, a minimum of three years within the most recent five years shall be used.

How An Assessment of the SAV/Clarity Standard Is Done: Critical Elements

- SAV acres.
- Clarity acres:
  - Application depth
  - Light attenuation (ke) or percent light through the water (PLW = e^{-ke*z} * 100%)
- When the standard is in effect, or the SAV growing season for three key oligohaline, mesohaline, and polyhaline SAV communities.

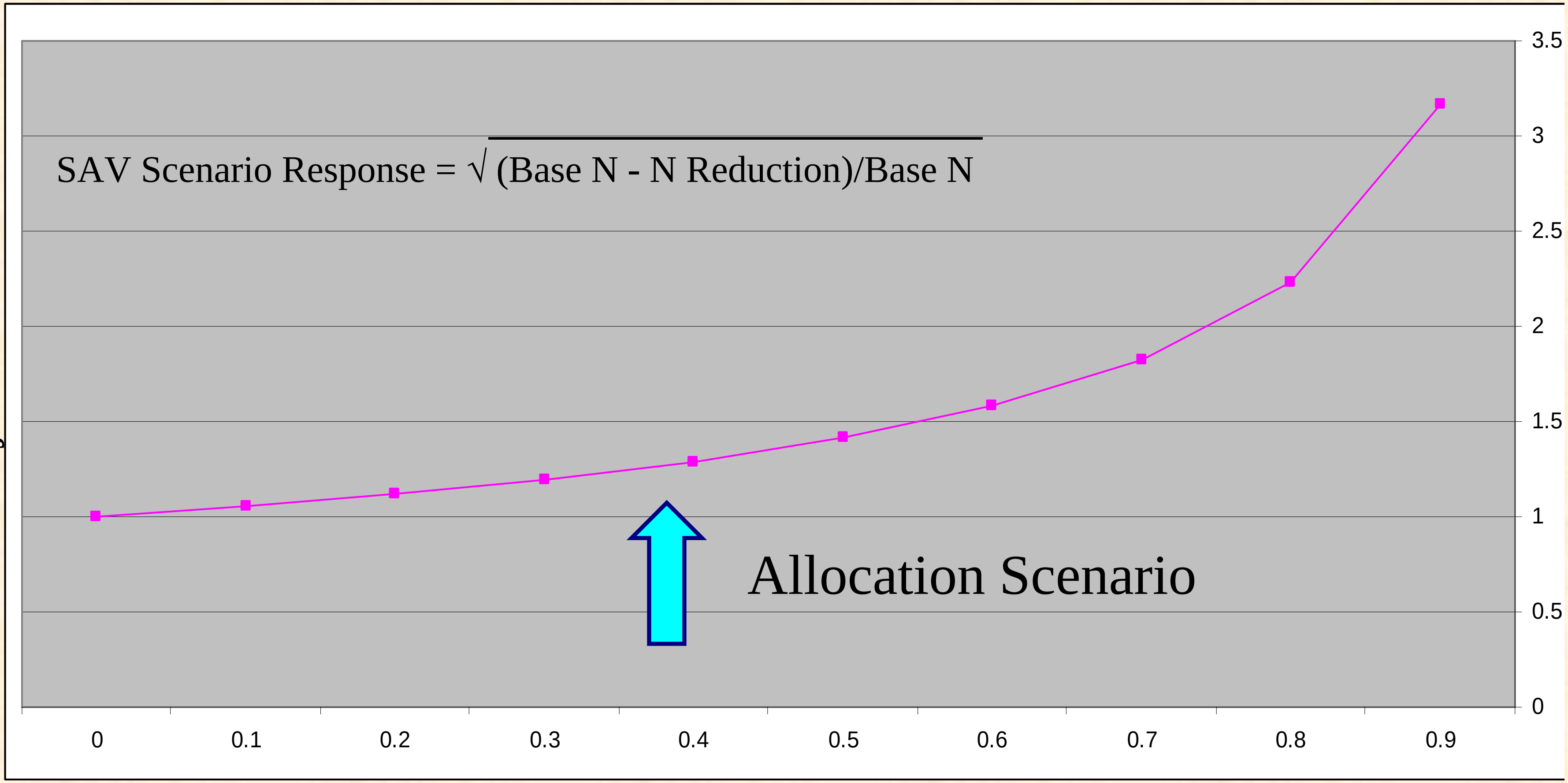
How An Assessment of the SAV Standard Is Done: Using Observed SAV Only

- The STAC review of the SAV clarity simulation recommended only quantifying the clarity standard with clarity acres using data correction.
- Rather than using the simulated SAV acres we can use the observed SAV acres that we know exist from our monitoring information.

How An Assessment of the Clarity Standard Is Done: SAV Credit

- For the scenarios a conservative factor of SAV improvement based on the square root of the percent nitrogen reduction which is applied to each simulation year’s observed SAV for 1991, 1992, etc. For the Allocation Scenario the factor is about 1.3.
- The factor of 1.3 is the lowest basin average SAV nutrient response factor for the 1984-86 period as compared to the 2007-2009 period (York Basin).

Adjusting the Observed SAV to Account for Scenario Nutrient & Sediment Reductions



SAV Adjustment Factor

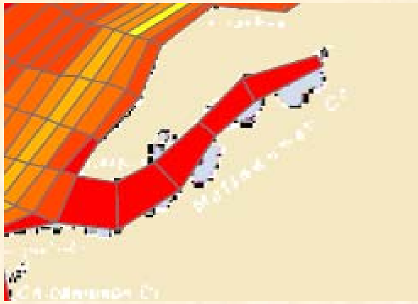
Base Calibration N – (Scenario Reduction N / Base Calibration N)

Taking Credit for the Observed SAV Acres

CBPSEG	state	Segment_Name	93 Acres	94 Acres	95 Acres		07 Acres	08 Acres	09 Acres
CB1TF1	MD	Northern Chesapeake Bay Segment 1	109	297	355	0	834	1,007	1,079
CB1TF2	MD	Northern Chesapeake Bay Segment 2	4,322	6,401	4,826	0	11,726	14,193	14,182
NORTF	MD	Northeast River	0	20	17	0	115	183	240
ELKOH1	MD	Elk River Segment 1	234	442	303	0	1,589	1,907	2,070
ELKOH2	MD	Elk River Segment 2	0	0	6	0	391	440	463
BOHOH	MD	Bohemia River	0	3	28	0	579	528	547
C&DOH	MD	Chesapeake & Delaware Canal	0	0	0	0	2	12	7
CB2OH	MD	Upper Chesapeake Bay	27	10	24	0	373	633	745
SASOH1	MD	Sassafras River Segment 1	186	177	422	0	368	552	808
SASOH2	MD	Sassafras River Segment 2	0	11	22	0	4	53	53
BSHOH	MD	Bush River	0	0	0	0	643	519	381
GUNOH1	**MD**	**Gunpowder River Segment 1**	**88**	**176**	**114**	**0**	**559**	**783**	**855**
GUNOH2	MD	Gunpowder River Segment 2	27	44	54	0	906	937	1,033
MIDOH	MD	Middle River	16	62	12	0	550	827	780
BACOH	**MD**	**Back River**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
CB3MH	MD	Upper Central Chesapeake Bay	800	820	855	0	124	189	234
PATMH	MD	Patapsco River	0	1	0	0	9	18	12
MAGMH	MD	Magothy River	33	46	78	0	83	90	12
CHSMH	MD	Lower Chester River	757	1,013	1,098	0	68	83	95
CHSOH	MD	Middle Chester River	0	0	0	0	0	0	0
CHSTF	**MD**	**Upper Chester River**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
CB4MH	MD	Middle Central Chesapeake Bay	12	0	0	0	0	0	0
EASMH	MD	Eastern Bay	1,813	2,412	3,329	0	80	90	473
CHOMH1	MD	Mouth of the Choptank River	4,285	3,607	3,657	0	1,257	461	649
CHOMH2	MD	Lower Choptank River	10	0	0	0	0	0	0
CHOOH	MD	Middle Choptank River	0	0	0	0	0	0	0
CHOTF	MD	Upper Choptank River	0	0	0	0	0	0	0
LCHMH	MD	Little Choptank River	382	133	45	0	141	80	177
SEVMH	MD	Severn River	0	77	126	0	326	311	211
SOUMH	MD	South River	0	4	5	0	8	0	0
RHDMH	MD	Rhode River	0	0	0	0	0	0	0
WSTMH	MD	West River	0	12	0	0	0	0	0
CB5MH	MD	Lower Central Chesapeake Bay	1,132	26	0	0	504	1,134	2,280
CB5MH	VA	Lower Central Chesapeake Bay	2,009	1,870	1,737	0	1,342	1,948	2,299
HNGMH	MD	Honga River	4,560	3,438	2,213	0	1,993	3,965	4,922
FSBMH	MD	Fishing Bay	39	64	27	0	0	22	147
NANMH	MD	Lower Nanticoke River	0	0	0	0	0	0	0
NANOH	MD	Middle Nanticoke River	0	0	0	0	0	0	0
NANTF	MD	Upper Nanticoke River	0	0	0	0	0	0	0
WICMH	MD	Wicomico River	0	0	0	0	0	0	0
TANMH1	MD	Tangier Sound Segment 1	8,373	5,528	4,433	0	4,204	5,076	7,129
TANMH1	VA	Tangier Sound Segment 1	8,501	6,812	6,986	0	5,382	5,846	5,635
TANMH2	MD	Tangier Sound Segment 2	0	0	0	0	0	0	5
MANMH1	MD	Manokin River Segment 1	387	165	231	0	285	415	585
MANMH2	MD	Manokin River Segment 2	0	0	0	0	0	0	0
BIGMH1	MD	Big Annemessex River Segment 1	458	399	443	0	571	722	849
BIGMH2	MD	Big Annemessex River Segment 2	0	0	0	0	0	0	0
POCMH	MD	Lower Pocomoke River	68	51	53	0	36	80	113
POCMH	VA	Lower Pocomoke River	1,848	1,592	1,566	0	1,063	1,317	1,721
POCOH	MD	Middle Pocomoke River	0	0	0	0	0	0	0

How An Assessment of the Clarity Standard Is Done: Clarity Credit

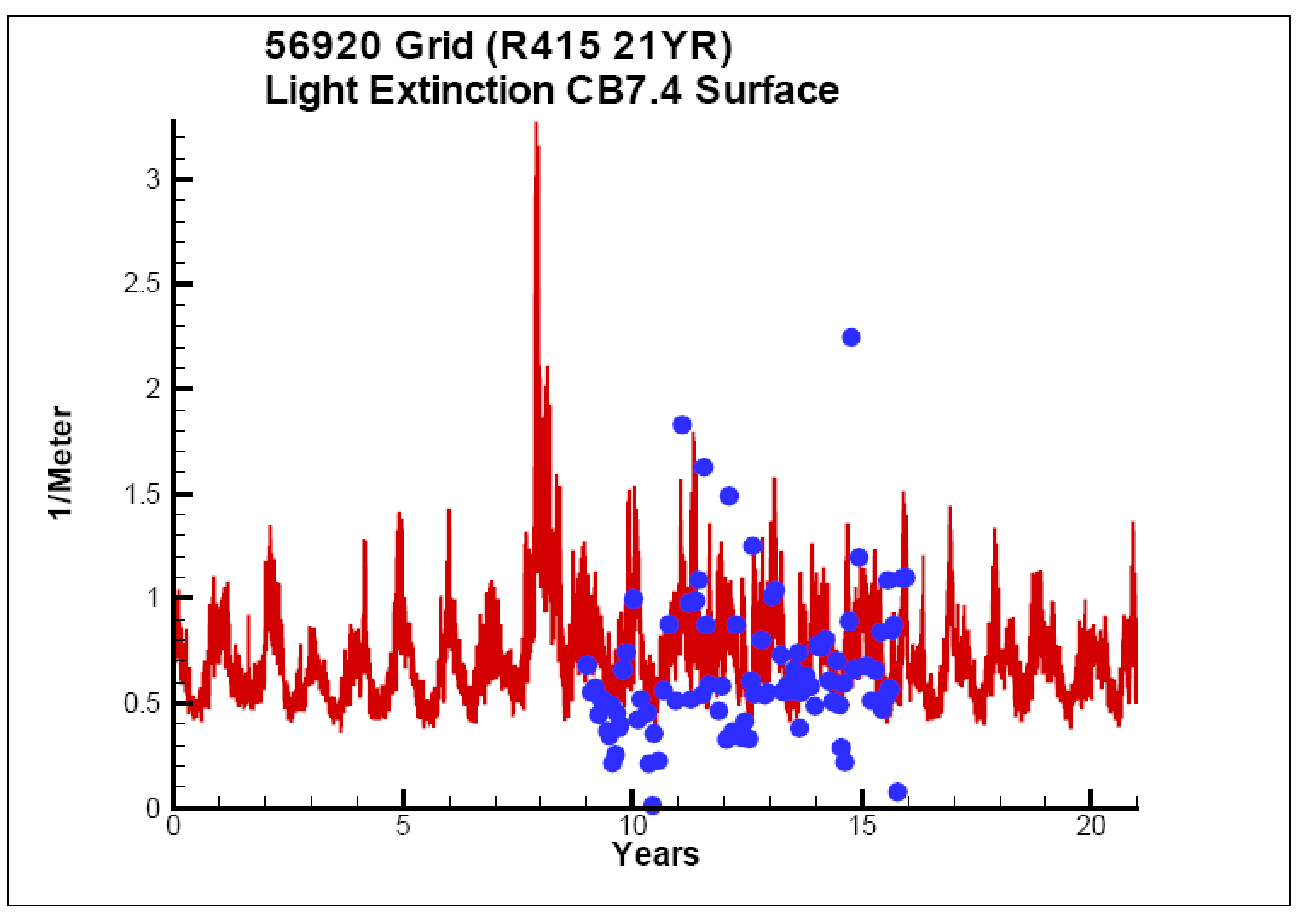
- Count monthly average pass/fail of ke of individual cells using simulated ke at the application depths.

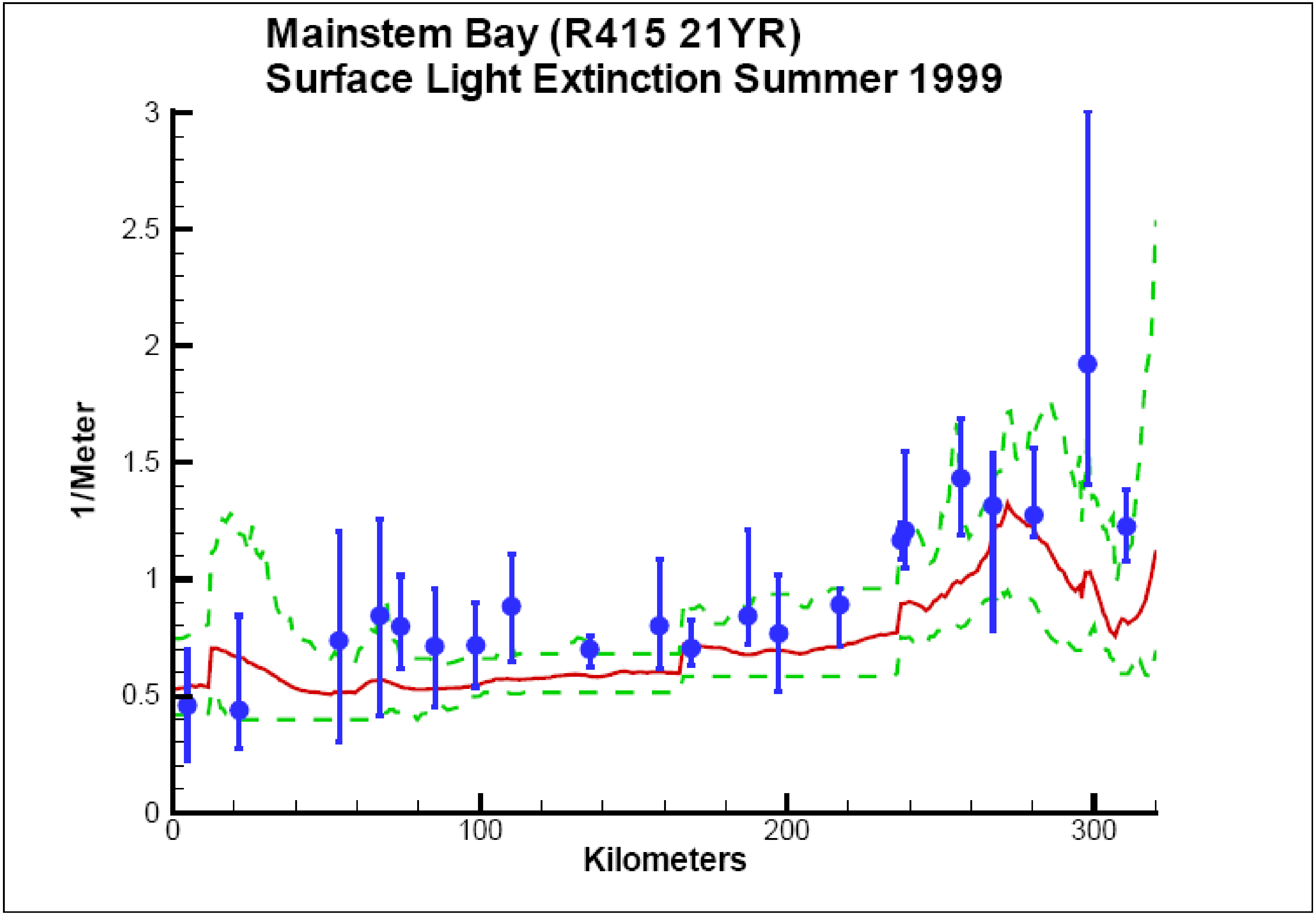


- Count all passed clarity area at all depths in each cell (0.5m, 1.0m, 1.5m, 2.0m) in all non-nogrow cells in the CB/DU segment.
- Data correction is not possible as shallow water monitoring didn't begin until after our simulation period. We use data adjustment to the shallow water model ke from channel monitoring and proportionally adjust the shallow water ke based on simulated and observed ke in the channel. This is considered to be an adjustment of the ke of the boundary condition water adjacent to the shallow water DU on a monthly basis with an average of two cruises where available.

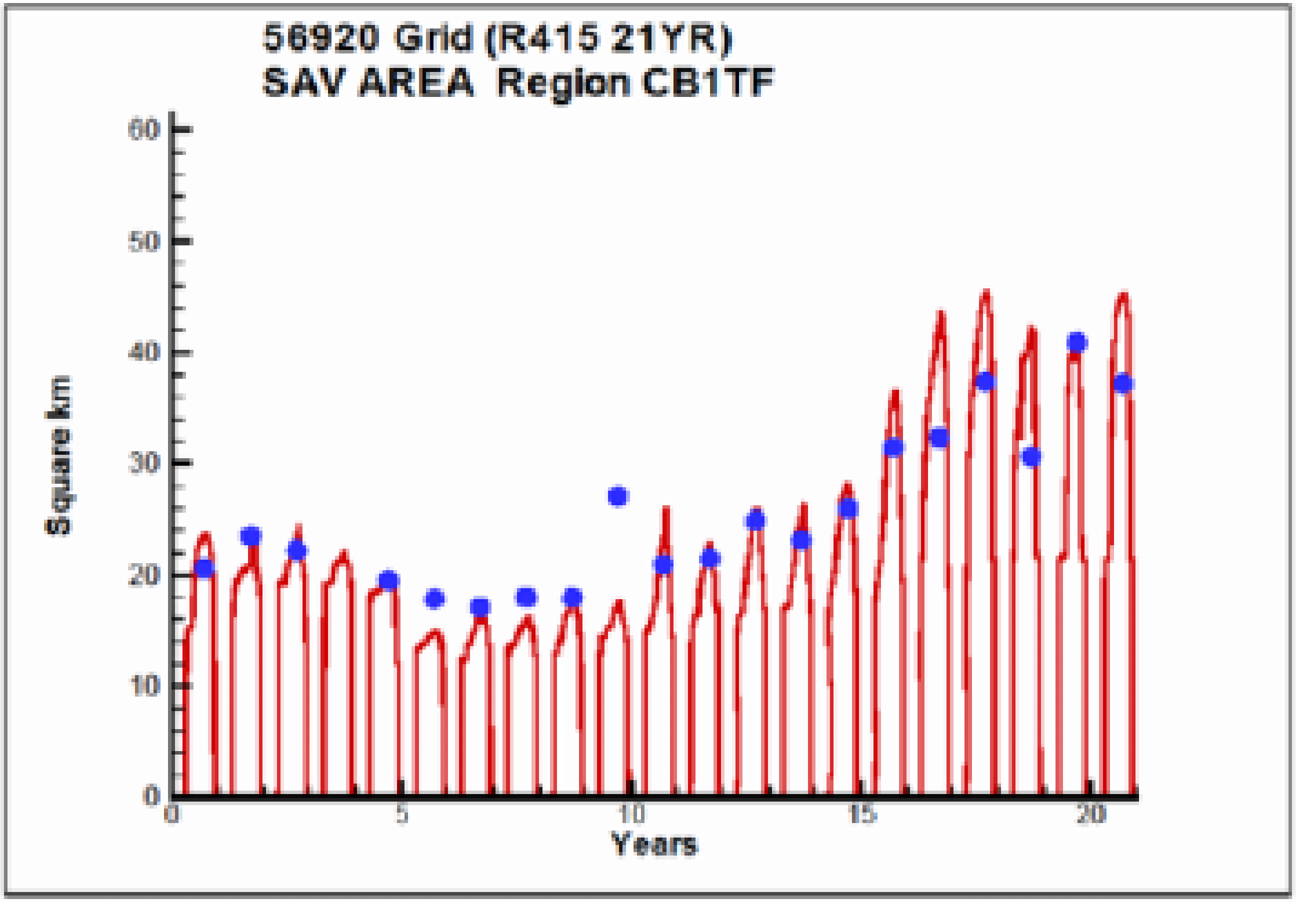
How An Assessment of the Clarity Standard Is Done: Combined Credit

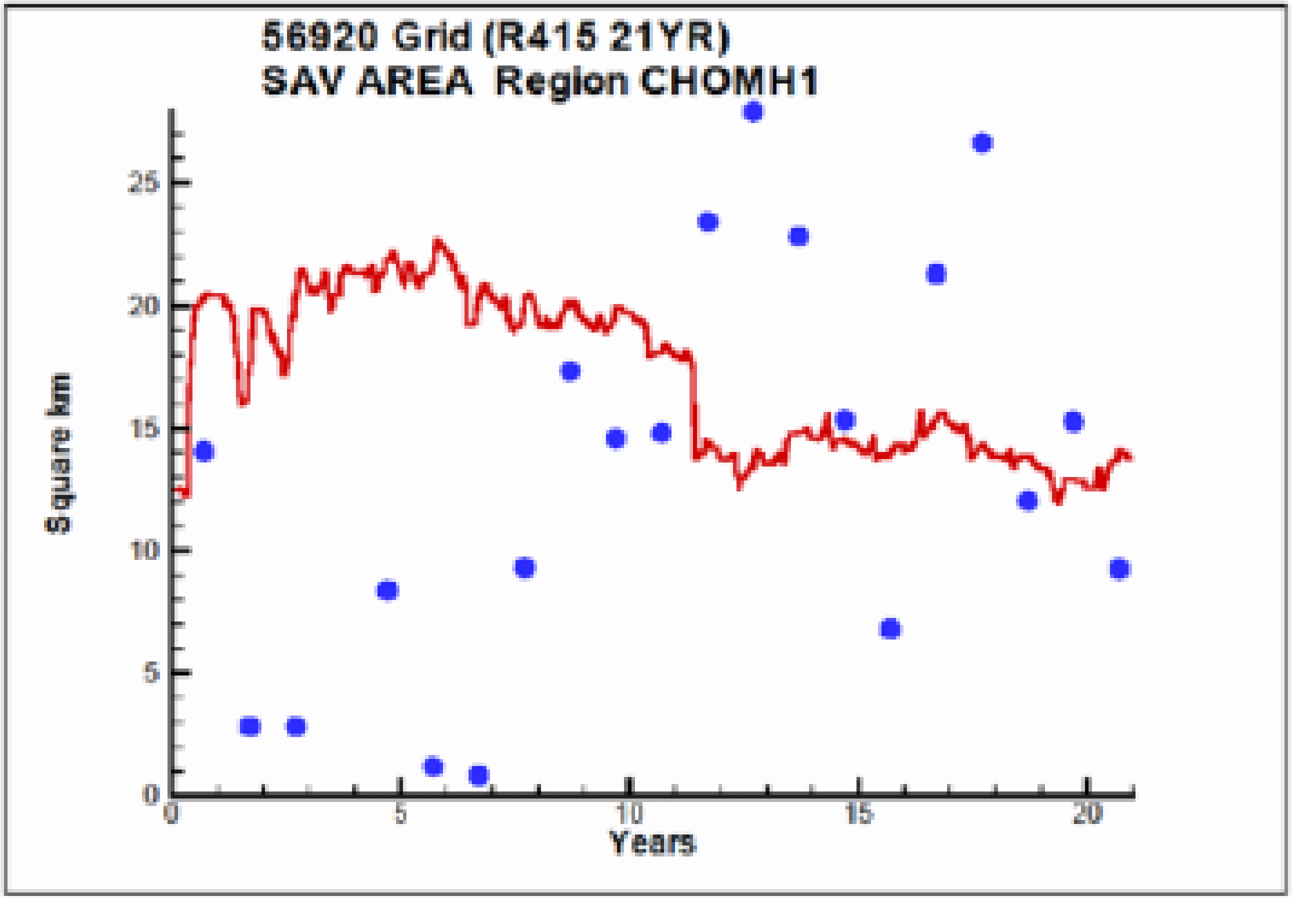
- Combine the clarity acres, after discounting the clarity acres by a factor of 2.5 clarity acres = 1 SAV acre, with the SAV acres, while avoiding double counting.
- Use the single best year of three contiguous years to compare with the standard.

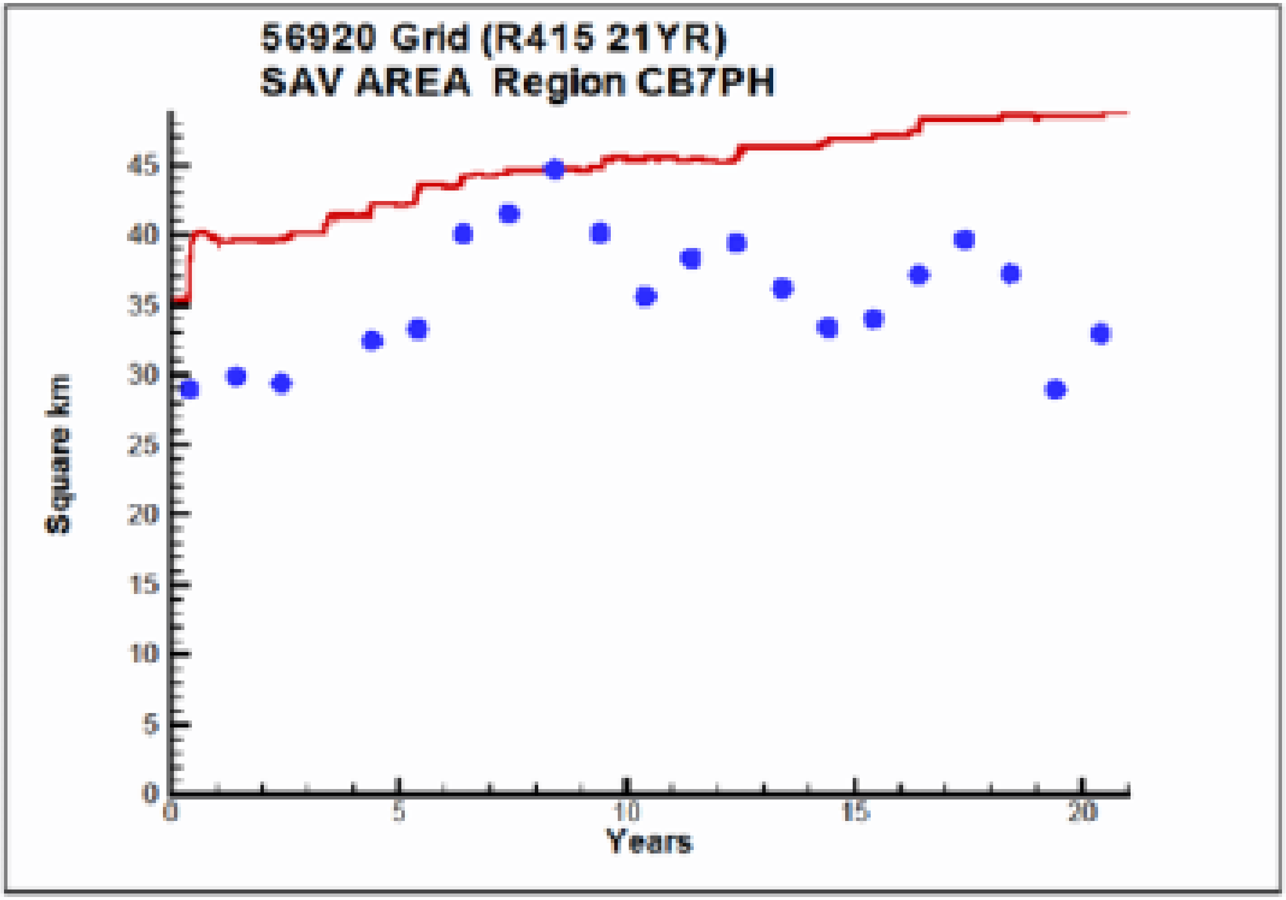

56920 Grid (R415 21YR)
Light Extinction CB7.4 Surface
1/Meter
Years
0
0.5
1
1.5
2
2.5
3
0
5
10
15
20



Mainstem Bay (R415 21YR)
Surface Light Extinction Summer 1999
1/Meter
0
0.5
1
1.5
2
2.5
3
0
100
200
300
Kilometers


56920 Grid (R415 21YR)
SAV AREA Region CB1TF
Square km
Years
0
10
20
30
40
50
60
0
5
10
15
20


56920 Grid (R415 21YR)
SAV AREA Region CHOMH1
Square km
0
5
10
15
20
25
0
5
10
15
20
Years


56920 Grid (R415 21YR)
SAV AREA Region CB7PH
Square km
Years
0
5
10
15
20
25
30
35
40
45

Use of a Critical Period for Assessing the SAV/clarity Water Quality Standard

Major Findings of Bell Flow Analysis

- From 1967-2009 the highest average Jan-May inflow was 1996-1998.
- Critical period of 1996-1998 is too extreme
  - contains 93rd and 98th percentile flow years
  - represents a 40-year return period
  - represents the 100th percentile
- Recommends:
  - **<u>10-year return period</u>**
  - **<u>1993-1995</u>** or 1994-1996

From September 2009 TT presentation to WQGIT

Use of a Critical Period:

Flow based 10 year return period:

1) Nutrient and sediment loads influencing SAV and clarity follow flow.
2) Consistent with previous decisions of WQGIT regarding DO and chlorophyll WQSs.
3) Consistent with previous decisions of WQGIT regarding 10 year return period.
4) Application of critical period eases ongoing analysis and tracking (yet as stringent as if all years were looked at).

Resolution Being Sought For Problem Segments

Nonattaining Segments:

APPTF - Appomattox Tidal Fresh

BACOH - Back River

CHSTF - Chester Tidal Fresh

GU1OH - Gunpowder Oligohaline

MATTF - Mattawoman Tidal Fresh

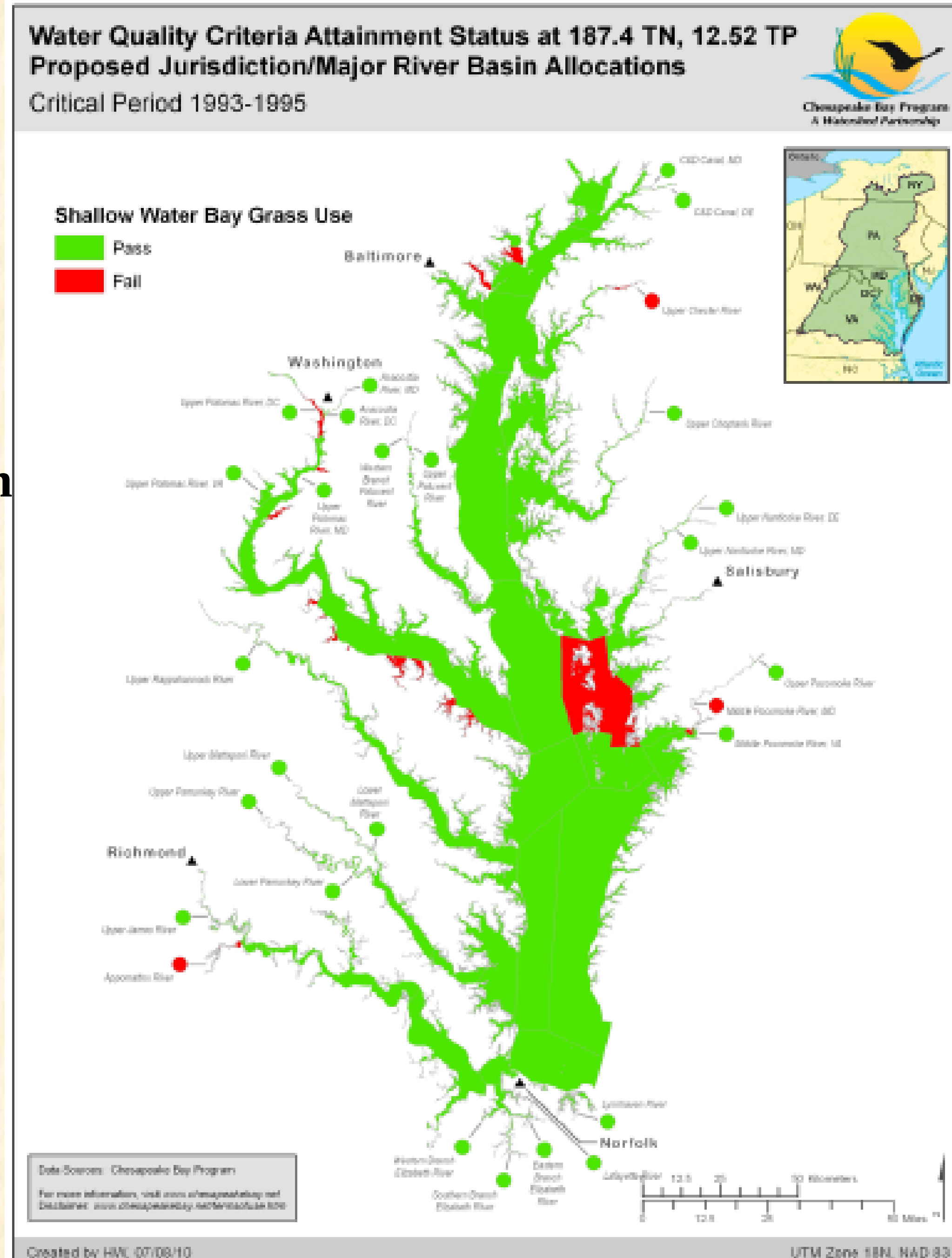
PISTF - Piscataway Tidal Fresh

POVMH - VA Potomac Mesohaline

DCPTF - DC Potomac Tidal Fresh

MPCOH - MD Pocomoke Oligohaline

TA1MH - MD Tangier Sound



	Scenaio state	*1985 Scenario 342TN 24.1TP 9,790TSS '93-95	91-'00 Base Scenario 309TN 19.5TP 8,950TSS '93-95	2009 Scenario 248TN 16.6TP 8,110TSS '93-95	Tributary Strategy 191TN 14.4TP 6,460TSS '93-95	190 Loading Scenario 190TN 12.6TP 6,030TSS '93-95	Allocation Scenario 187TN 12.5TP 6,040TSS '93-95	179 Loading Scenario 179TN 12.0TP 5,850TSS '93-95	170 Loading Scenario 170TN 11.3TP 5,650TSS '93-95	E3 Scenario 141TN 8.5TP 5,060TSS '93-95	All Forest Scenario 57.7TN 4.4TP 3,240TSS '93-95
APPTF	VA	11%	14%	6%	4%	3%	1%	2%	2%	0%	0%
BACOH	MD	70%	29%	25%	20%	27%	24%	25%	25%	24%	45%
BI1MH	MD	22%	22%	0%	0%	0%	0%	0%	0%	0%	0%
BI2MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BOHOH	MD	14%	6%	0%	0%	0%	0%	0%	0%	0%	0%
BSHOH	MD	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
C11TF	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
C12TF	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CB2OH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CB3MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CB4MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MD5MH	MD	49%	47%	2%	0%	0%	0%	0%	0%	0%	0%
VA5MH	VA	11%	11%	0%	0%	0%	0%	0%	0%	0%	0%
CB6PH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CB7PH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CB8PH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CHKOH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CHOMH1	MD	8%	6%	0%	0%	0%	0%	0%	0%	0%	0%
CHOMH2	MD	30%	27%	0%	0%	0%	0%	0%	0%	0%	0%
CHOOH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CHOTF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHSMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CHSOH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CHSTF	MD	95%	95%	89%	80%	80%	80%	67%	51%	13%	0%
CDDOH	DE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CMDOH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CRRMH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DCATF	DC	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MDATF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EASMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EBEMH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ELIPH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EL1OH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EL2OH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FSBMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GU1OH	MD	80%	79%	62%	44%	43%	43%	43%	43%	42%	33%
GU2OH	MD	23%	17%	0%	0%	0%	0%	0%	0%	0%	0%
HNGMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
JMSPH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
JMSTFL	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
JMSTFU	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LAFMH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LCHMH	MD	27%	26%	0%	0%	0%	0%	0%	0%	0%	0%
MAGMH	MD	14%	11%	0%	0%	0%	0%	0%	0%	0%	0%
MA1MH	MD	37%	35%	0%	0%	0%	0%	0%	0%	0%	0%
MA2MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MATTF	MD	66%	53%	47%	43%	43%	43%	43%	42%	40%	28%

	Scenaio state	*1985 Scenario 342TN 24.1TP 9,790TSS '93-95	91-'00 Base Scenario 309TN 19.5TP 8,950TSS '93-95	2009 Scenario 248TN 16.6TP 8,110TSS '93-95	Tributary Strategy 191TN 14.4TP 6,460TSS '93-95	190 Loading Scenario 190TN 12.6TP 6,030TSS '93-95	Allocation Scenario 187TN 12.5TP 6,040TSS '93-95	179 Loading Scenario 179TN 12.0TP 5,850TSS '93-95	170 Loading Scenario 170TN 11.3TP 5,650TSS '93-95	E3 Scenario 141TN 8.5TP 5,060TSS '93-95	All Forest Scenario 57.7TN 4.4TP 3,240TSS '93-95
MIDOH	MD	33%	33%	5%	0%	0%	0%	0%	0%	0%	0%
MOBPH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MPNOH	VA	8%	11%	0%	0%	0%	0%	0%	0%	0%	0%
MPNTF	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NANMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NANOH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DENTF	DE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MDNTF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NORTF	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PATMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PA1MH	MD	24%	22%	0%	0%	0%	0%	0%	0%	0%	0%
PA2MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PA3MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PA4MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PA5MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PAXOH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PAXTF	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PIAMH	VA	3%	8%	0%	0%	0%	0%	0%	0%	0%	0%
PISTF	MD	51%	46%	32%	32%	32%	32%	31%	30%	12%	0%
PMKOH	VA	39%	39%	0%	0%	0%	0%	0%	0%	0%	0%
PMKTF	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MPCMH	MD	11%	10%	0%	0%	0%	0%	0%	0%	0%	0%
VPCMH	VA	19%	19%	0%	0%	0%	0%	0%	0%	0%	0%
MPCOH	MD	67%	67%	8%	6%	6%	6%	3%	0%	3%	0%
VPCOH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POCTF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POMMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
POVMH	VA	37%	33%	14%	10%	10%	10%	10%	10%	9%	6%
POMOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PO1OH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PO2OH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PO3OH	MD	23%	22%	0%	0%	0%	0%	0%	0%	0%	0%
POVOH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DCPTF	DC	43%	42%	30%	20%	20%	20%	19%	18%	10%	3%
MDPTF	MD	21%	21%	0%	0%	0%	0%	0%	0%	0%	0%
POVTF	VA	12%	5%	0%	0%	0%	0%	0%	0%	0%	0%
RHDMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RPPMH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RPPOH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RPPTF	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SA1OH	MD	26%	25%	4%	0%	0%	0%	0%	0%	0%	0%
SA2OH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SBEMH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SEVMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SOUMH	MD	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TAMMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TA1MH	MD	42%	41%	4%	3%	3%	3%	3%	3%	2%	1%
TA2MH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TAVMH	VA	33%	34%	0%	0%	0%	0%	0%	0%	0%	0%
WBEMH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WICMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
WSTMH	MD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
YRKMH	VA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Resolution being sought of problem segments so far:

<u>MATTF, Mattawoman Tidal Fresh</u> – SAV in 2008 (877 acres) exceeds the 792 acres of the SAV standard.

<u>PISTF, Piscataway Tidal Fresh Tidal Fresh</u> – SAV in 2008 (765 acres) approximates attainment of the 789 acre SAV standard.

<u>APPTF, Appomattox Tidal Fresh</u> – Standard sets SAV acres at 379 acres. No SAV observed from 1978 to present. Persistent low level nonattainment (1%) estimated at Allocation Scenario loads, but application of a “1% Rule” may move this segment into attainment.

Taking Credit for the Observed SAV Acres

SAV area data (hectares). See http://www.vims.edu/bio/sav for more information. Units in Hectares.

CBPSEG	state	Segment_Name	1971	1974	1978	1979	1980	1981	1984	1985	2003	2004	2005	2006	2007	2008	2009
CB1TF1	MD	Northern Chesapeake Bay Segment 1	0	0	0	0	0	0	7	17	229	252	301	246	337	408	437
CB1TF2	MD	Northern Chesapeake Bay Segment 2	0	0	834	220	0	0	2,170	2,039	2,834	3,837	3,419	3,538	4,745	5,744	5,739
NORTF	MD	Northeast River	0	0	6	0	0	0	0	0	19	34	32	54	47	74	97
ELKOH1	MD	Elk River Segment 1	0	0	1	0	0	0	14	39	131	684	676	652	643	772	838
ELKOH2	MD	Elk River Segment 2	0	0	0	0	0	0	0	0	9	90	118	153	158	178	187
BOHOH	MD	Bohemia River	0	0	0	0	0	0	0	8	117	295	371	287	234	214	221
C&DOH	MD	Chesapeake & Delaware Canal	0	0	1	0	0	0	0	0	0	3	4	1	1	5	3
CB2OH	MD	Upper Chesapeake Bay	0	0	50	21	0	0	11	127	86	527	433	176	151	256	302
SASOH1	MD	Sassafras River Segment 1	0	0	2	0	0	0	20	28	123	415	455	330	149	223	327
SASOH2	MD	Sassafras River Segment 2	0	0	4	0	0	0	0	0	27	100	142	20	2	21	22
BSHOH	MD	Bush River	0	0	1	0	0	0	2	12	158	414	294	131	260	210	154
GUNOH1	MD	Gunpowder River Segment 1	0	0	180	139	0	0	0	32	8	536	179	95	226	317	346
GUNOH2	MD	Gunpowder River Segment 2	0	0	17	7	0	0	0	16	190	432	522	246	367	379	418
MIDOH	MD	Middle River	0	0	107	216	0	0	0	78	158	271	184	93	223	335	316
BACOH	MD	Back River	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0
CB3MH	MD	Upper Central Chesapeake Bay	0	0	555	380	0	0	382	366	9	368	229	69	50	76	95
PATMH	MD	Patapsco River	0	0	49	2	0	0	0	0	3	82	113	19	4	7	5
MAGMH	MD	Magothy River	0	0	141	192	0	0	10	5	68	121	125	101	34	36	5
CHSMH	MD	Lower Chester River	0	0	1,050	923	0	0	418	369	47	296	187	74	27	34	39
CHSOH	MD	Middle Chester River	0	0	0	0	0	0	0	0	0	2	92	0	0	0	0
CHSTF	MD	Upper Chester River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB4MH	MD	Middle Central Chesapeake Bay	0	0	103	9	0	0	18	35	9	4	0	0	0	0	0
EASMH	MD	Eastern Bay	0	0	1,339	416	0	0	87	393	663	421	311	229	32	36	192
CHOMH1	MD	Mouth of the Choptank River	0	0	1,843	837	0	0	58	1,405	1,202	1,527	928	422	509	186	263
CHOMH2	MD	Lower Choptank River	0	0	94	79	0	0	0	36	0	0	0	0	0	0	0
CHOOH	MD	Middle Choptank River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHOTF	MD	Upper Choptank River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LCHMH	MD	Little Choptank River	0	0	134	4	0	0	28	367	317	494	105	49	57	33	71
SEVMH	MD	Severn River	0	0	134	130	0	0	0	0	90	157	172	166	132	126	85
SOUMH	MD	South River	0	0	21	0	0	0	0	0	6	19	4	0	3	0	0

Resolution being sought of problem segments so far:

DCPTF, DC Potomac Tidal Fresh – Our mistake! We suspect a problem with our assessment as about 681 acres of observed acres in 1993 show up as "missing data" in our output. Needs follow up, but likely to move this segment from its estimated current Allocation Scenario 20% nonattainment level into full attainment for the DC standard of 368 acres.

BACOH, Back River – No SAV in historical record, assessment is for ke only at 0.5m. Nonattainment estimated at 24% at the Allocation Scenario load level.

CHSTF, Chester Tidal Fresh – No SAV in historical record, assessment is for ke only at 0.5m. Nonattainment estimated at 80% at the Allocation Scenario load level.

This assessment assumes a critical period of '93-'95.

Resolution being sought of problem segments so far:

MPCOH, Maryland Pocomoke Oligohaline – No SAV in historical record, assess for ke only at 0.5m. Initial thinking is that "color" from dissolved organic carbon may be contributing to the persistent low level of nonattainment (6% estimated at Allocation Loads).

TA1MH, Tangier Sound in Maryland – Persistent low level of nonattainment (3% estimated at Allocation Scenario loads).

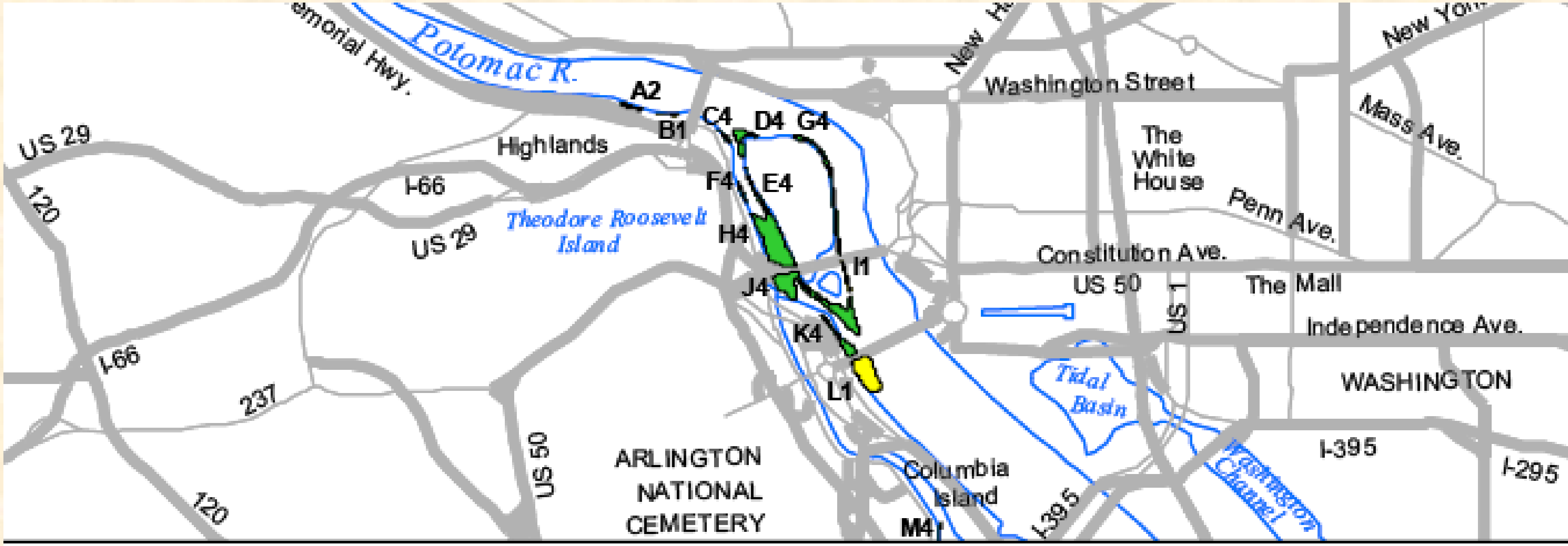
POVMH, Potomac Virginia Mesohaline - Persistent low level of nonattainment (10% estimated at Allocation Scenario loads).

This assessment assumes a critical period of '93-'95.

Resolution being sought of problem segments so far:

GUNOH2 - Gunpowder Oligohaline – The estimated clarity acres of 1,870 (not applying the 2.5 clarity acre discount) at the Allocation Scenario along with the SAV credit of 342 acres is insufficient satisfy the clarity restoration goal of 1,860 acres. The observed 2009 SAV acres of 346 acres is also insufficient Our assessment tracks a nonattainment level of 43% in GUNOH1, yet surrounding segments of the GUNOH1, CB2, and Middle River are in full achievement. Resolution is still being sought.

This assessment assumes a critical period of ‘93-’95.



243 total acres of SAV Observed in DC Potomac Tidal Fresh in 2008

Hectares of SAV: 16.96
Date Flown: 10/08

1,000 0 1,000 2,000 Meters

2008 SAV Density Class

0-10%	10-40%	40-70%	70-100%

Sources: VIMS,USGS **PDF Created:** 10/7/2009

http://web.vims.edu/bio/sav/maps.html

Getting to August 13th and Final Sediment Allocations

Schedule for Getting to Final Sediment Allocations:

Week of July 12 :

o WQGIT Conference Call:

- Briefing on how States/DC WQS related to SAV and water clarity are structured.
- Walk through how the Bay model scenario outputs are used to assess water clarity criteria attainment.
- Address the critical period.
- Outline the big picture current status.
- Review the week by week schedule.
- Request series of decisions.

o Focus on diagnosing the 10 identified non-attaining segments.

o Write-up recommended resolutions for subset of non-attaining segments which have clear resolution at this time.

Schedule for Getting to Final Sediment Allocations:

Week of July 19th

o WQGIT Conference Call:

- Present the findings from the diagnostics of the 10 non-attaining segments
- Present proposed resolution for a subset of the non-attaining segments
- Walk through proposed next steps on the further diagnostics of remaining non-attaining segments
- Request series of decisions
- Review draft jurisdiction/major river basin sediment allocations; compare with other key reference scenarios

o Continue work on diagnosing the remaining subset of non-attaining segments

- Explore 1985-2009 based SAV acreage/model simulated loads regressions for adjustment of SAV credits under scenario nutrient and sediment load conditions.
- Explore daily vs. monthly model simulated Ke calculations for impacts on water clarity attainment

Schedule for Getting to Final Sediment Allocations:

Week of July 26th

o Co-regulators Conference Call:

- Present final recommendations for resolving remaining non-attainment segments.
- Present draft jurisdiction/major river basin sediment allocations along with comparison with other key reference scenarios for comment and feedback.

Week of August 2nd

o Co-regulator Conference Call:

- Get final feedback/reactions from States, DC on the proposed sediment allocations

o Outreach to the PSC members.

Week of August 9th

o Outreach to PSC members.

o Send letter to PSC members on State/basin sediment allocations.

Decisions Requested:

- Approve approach taken in SAV/clarity criteria assessment.
  - Use of observed SAV with a conservative adjustment for reduced nutrient and sediment loads under scenario conditions.
  - Explore 1985-2009 based SAV acreage/model simulated load regressions for adjustment of SAV credits under scenario nutrient and sediment load conditions.
  - Explore daily vs. monthly model simulated Ke calculations for impacts on water clarity attainment.

Decisions Requested:

- Approve recommendation for ’93-’95 as critical year for SAC/clarity.
- Approve the week by week schedule setting the August 13 transmittal of the jurisdiction by major river basin sediment allocation.
- Agreement on the next steps coming out of the conference call.