

Coastal Bays Report Card

Proposed Changes for 2010

Coastal Bays STAC

January 5, 2011

Tidewater Ecosystem Assessment

New Scoring Scale

- **0-5**

- allows a failing grade (F)

- the minimum score using the previous scale was 20 – a “D”

0 - 19 = F

20 - 39 = D

40 - 59 = C

60 - 79 = B

80 - 100 = A

- How do results using this scale compare to prior years?

Summary

divides lowest score bin to allow a score of 0

region	2009 Health Index as presented (1-5)	2009 0-5 Health Index (6-point scale)	2009 0-5 Water Quality Index (WQI) minus living resources	2009 0-5 WQI minus living resources and non-tidal stations	2009 WQI + secchi (0-5) secchi added
Sinepuxent	69.4 B	67.4 B	74.8 B	74.8 B	74.8 B
Isle of Wight	58.7 C	59.4 C+	64.4 C	64.4 C+	59.5 C
Chincoteague	61.5 B-	61.5 B	77.3 B	77.3 B	69.9 B
Assawoman	56.1 C	57.0 C	65.2 C	(1)a 69.5 C	65.2 B
Newport	34.9 D	36.0 D	46.8 D	(3) 46.0 D	39.2 D
St. Martin River	39.6 D+	39.3 D+	47.0 D	(2) 46.4 D+	41.7 C
Entire system	59.4 C++	59.96 C++	73.90 B	74.1 B	67.49 B

a number of stations deleted from WQI

* Changing to 0-5 scale maintains score (~ 59) and letter grade (C++)

Changing the Index

- **Water Quality Index** basis (WQI)
 - add Secchi
 - remove Living Resources (SAV, Hard Clam)
 - remove non-tidal stream WQ
- create a new index for **Living Resources** (LRI)
 - include SAV, Hard Clam
 - add new indicator (Summer Flounder)
- create a new index for **System Stressors**
 - Stream Nutrients
 - place non-tidal sites from WQI here
 - Brown Tide
 - Macroalgae (future)

Adding New WQ Indicators

Secchi

(meters)

5	≥ 2
4	1.6 – 2
3	1.2 - 1.6
2	0.8 - 1.2
1	0.4 - 0.8
0	< 0.4

New Water Quality Index

- How do results using this index compare to prior years?
 - using 0-5 scoring scale

Coastal Bays Health Index 2009 minus living resources and non-tidal stations

	DO	TN	TP	Chl-a	WQ Index	area (km2)	Area Weighted WQ Index
Sinepuxent	33.3	100.0	68.6	97.1	74.8	24.1	4.6389
Isle of Wight	48.9	68.6	50.0	90.0	64.4	21.1	3.4967
Chincoteague	48.2	94.7	67.4	98.9	77.3	298	59.3253
Assawoman	48.0	60.0	70.0	100.0	69.5	20.9	3.7398
Newport	36.9	32.9	41.4	72.9	46.0	15.9	1.8838
St. Martin River	38.0	40.0	36.9	70.8	46.4	8.4	1.0040
						388.40	74.09

6 point scale

Summary

divides lowest score bin to allow a score of 0

region	2009 Health Index as presented (1-5)	2009 0-5 Health Index (6-point scale)	2009 0-5 Water Quality Index (WQI) minus living resources	2009 0-5 WQI minus living resources and non-tidal stations	2009 WQI + secchi (0-5) secchi added
Sinepuxent	69.4 B	67.4 B	74.8 B	74.8 B	74.8 B
Isle of Wight	58.7 C	59.4 C+	64.4 C	64.4 C+	59.5 C
Chincoteague	61.5 B-	61.5 B	77.3 B	77.3 B	69.9 B
Assawoman	56.1 C	57.0 C	65.2 C	(1)a 69.5 C	65.2 B
Newport	34.9 D	36.0 D	46.8 D	(3) 46.0 D	39.2 D
St. Martin River	39.6 D+	39.3 D+	47.0 D	(2) 46.4 D+	41.7 C
Entire system	59.4 C++	59.96 C++	73.90 B	74.1 B	67.49 B

a number of stations deleted from WQI

* removing non-tidal sites and living resources raises letter grade by 1 (C++ to B)

* adding secchi drops score (74.1 to 67.5) but maintains letter grade (B)

New Indices for 2010

Living Resources

- Summer Flounder

plus

- SAV
- Hard Clam

Stressors

- Brown Tide
- Stream Nutrients
(TN & TP)

Living Resources Index

Summer Flounder

- Presence / absence data, April – November
- 0 – 100% for each segment

Living Resources Index

2009 Strawman

	Hard Clam	SAV	P/A % Flounder	LR Index	area km2	area weighted index
Sinepuxent	36.5	69.00	66.7	57.40	24.1	3.5617
Isle of Wight	68.9	30.08	85.7	61.57	21.1	3.3448
Chincoteague	9.7	49.79	73.2	44.24	298	33.9405
Assawoman	31.0	49.94	71.4	50.79	20.9	2.7331
Newport	11.8	17.43	92.9	40.69	15.9	1.6655
St. Martin River	ND	8.45	78.57	43.51	8.4	0.9410
					388.40	46.19

bay-specific clam goals

SAV % coverage

Living Resources Index

2009 Strawman

region	2009 LRI	Grade
Sinepuxent	57.4	C
Isle of Wight	61.6	B
Chincoteague	44.2	C
Assawoman	50.8	C
Newport	40.7	C
St. Martin River	43.5	C
Entire system	46.19	C

System Stressors

Brown Tide

- Index derived from the highest annual measured cell count in each segment
- No samples are collected in St. Martin River

Score	Maximum cell density (cells/ml)
5	0 cells detected in segment
4	1 - <35,000
3	>35,000-200,000
2	>200,000 - 499,000
1	>500,000
0	>1,000,000

System Stressors

Brown Tide

	Max cell count	2010 Brown Tide Attainment	BT Index	area (km2)	area weighted index
Sinepuxent	849489	1	20	24.1	1.2423
Isle of Wight	616	4	80	21.1	4.3505
Chincoteague	1024944	0	0	298	0.0000
Assawoman	1747	4	80	20.9	4.3093
Newport	42668	3	60	15.9	2.4588
St. Martin River	ND	ND			
				380.00	12.36

System Stressors

Stream Nutrients

- index of non-tidal TN & TP
 - spring data collected by MCBP & ASIS
 - 53 + 12 stations
 - monthly data collected by DNR
 - 6 stations
 - for consistency with MCBP & ASIS, use only data collected in March
 - no data collected from Sinepuxent at present

System Stressors

Stream Nutrients

- index of non-tidal TN & TP
 - use MBSS Eastern Shore freshwater stream sentinel site data to determine threshold values
 - CORS-102-S-2010UT Emory Creek
 - LOCR-102-S-2010 Swan Creek
 - NASS-108-S-2010 Nassawango Creek
 - NASS-302-S-2010 Nassawango Creek
 - UPCK-113-S-2010UT Choptank River
 - UPCR-208-S-2010 Cypress Branch
 - WIRH-220-S-2010 Comelly Mill Branch
 - 10-year increasing trend in TN values in Comelly Mill Branch skew results so this station was eliminated from threshold calculations

System Stressors

Stream Nutrients

Thresholds

		TN	TP
5	10 th percentile	5 <0.49	5 <0.022
4	2 nd quartile	4 0.49 - 0.61	4 >0.022 - 0.031
3	median	3 >0.61 - 0.741	3 >0.031 - 0.048
2	3 rd quartile	2 >0.741 - 0.942	2 >0.048 - 0.09
1	90 th percentile	1 >0.942 - 1.23	1 >0.09 - 0.135
0	> 90 th percentile	0 >1.23	0 >0.135

System Stressors

Stream Nutrients

	median values		attainment			area km2	area weighted index
	TN mg/L	TP mg/L	TN Score	TP Score	Index		
Sinepuxent	ND	ND				24.1	
IOW	2.08	0.051	0	2	20	21.1	1.1584
Chinco	1.69	0.053	1	2	30	298	24.5402
Assa	2.13	0.060	0	2	20	20.9	1.1474
Newport	2.11	0.069	0	2	20	15.9	0.8729
SMR	2.25	0.075	0	2	20	8.4	0.4612
						364.30	28.18

System Stressors Index

	median values		max	attainment			SSI Index	area (km2)	Area Weighted Index
	TN mg/L	TP mg/L	BT cells/ml	TN Score	TP Score	BT Score			
Sinepuxent	ND	ND	849489			1	20.0	24.1	1.2410
Isle of Wight	2.08	0.051	616	0	2	4	40.0	21.1	2.1730
Chincoteague	1.69	0.053	1024944	1	2	0	20.0	298	15.345
Assawoman	2.13	0.060	1747	0	2	4	40.0	20.9	2.1524
Newport	2.11	0.069	42668	0	2	3	33.3	15.9	1.3646
St. Martin R	2.25	0.075	ND	0	2	ND	20.0	8.4	0.4325
System				4.0	40.0	48.0	28.9	388.4	21.47

System Stressors

Region	2010 SSI	Grade
Sinepuxent	20.0	D
Isle of Wight	40.0	C
Chincoteague	20.0	D
Assawoman	40.0	C
Newport Bay	33.3	D
St. Martin River	20.0	D
System-wide	21.47	D

Overall Grading Example

region	2009 WQI + secchi (0-5)	
Sinepuxent	74.8	B
Isle of Wight	59.5	C
Chincoteague	69.9	B
Assawoman	65.2	B
Newport	39.2	D
St. Martin R.	41.7	C
Entire system	67.49	B

WQI = B

2009 LRI	
57.4	C
61.6	B
44.2	C
50.8	C
40.7	C
43.5	C
46.19	C

LRI = C

2010 SSI	
20.0	D
40.0	C
20.0	D
40.0	C
33.3	D
20.0	D
21.47	D

SSI = D

Narrative Proposals

- WQI presented as both segment and overall grades
 - Include narrative description of important trends and changes
- LRI presented as narrative only, with qualitative score rather than grades
 - Describe important trends and changes bay-wide and by segment
- SSI presented as narrative only, with qualitative scores rather than grades
 - Describe important trends and changes baywide and by segment

STAC comments & suggestions . . .