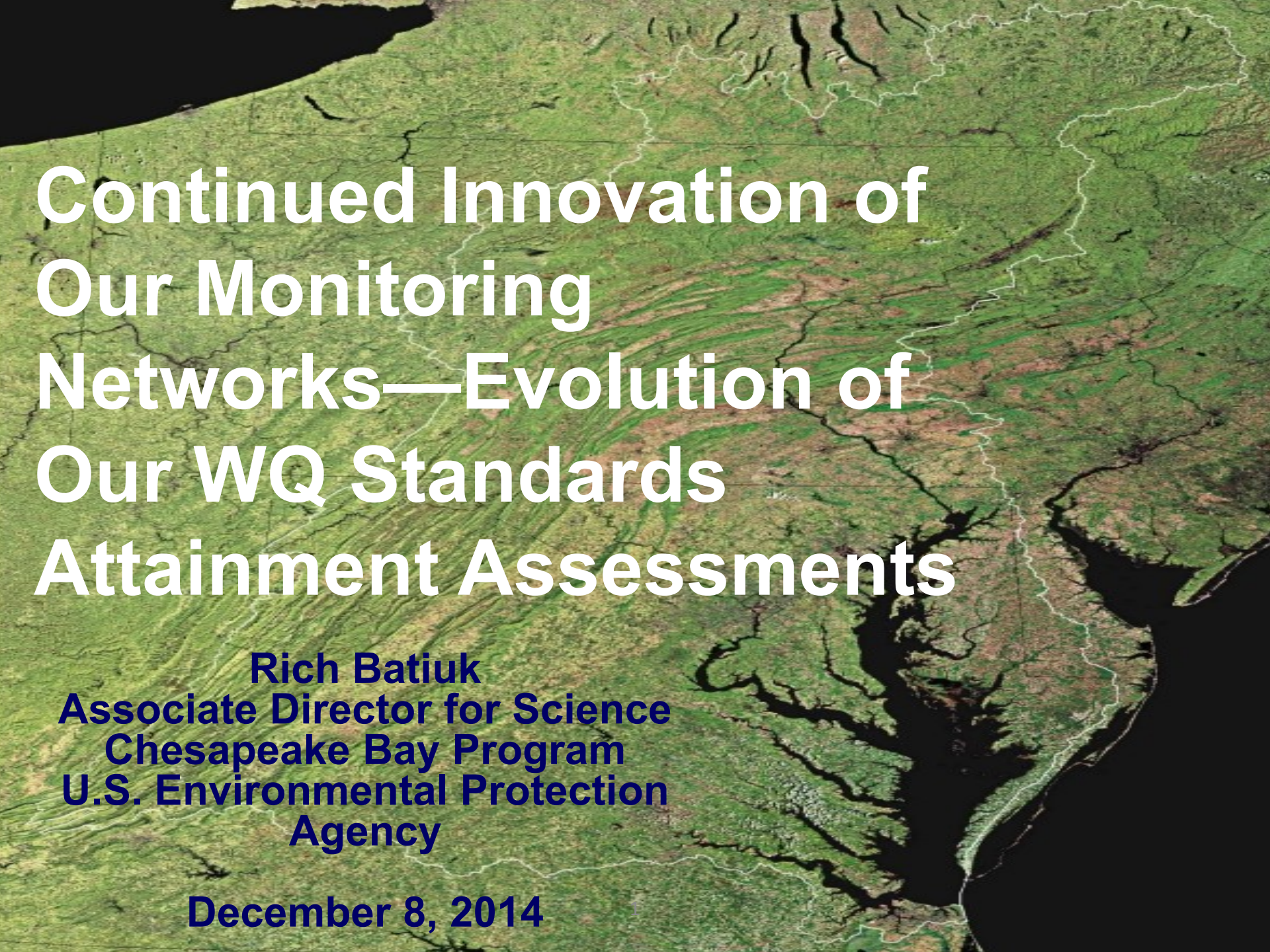
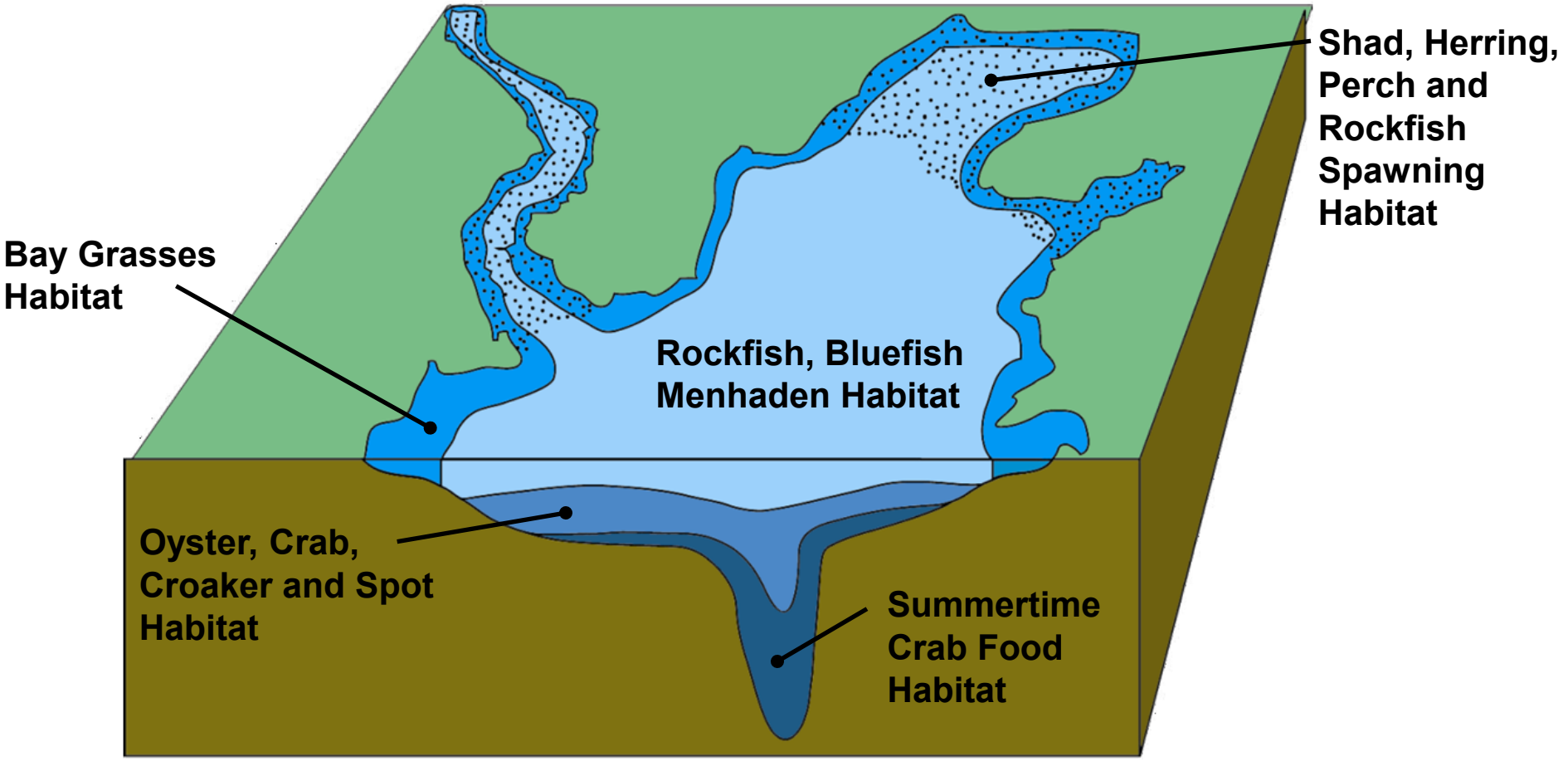


Continued Innovation of Our Monitoring Networks—Evolution of Our WQ Standards Attainment Assessments

Rich Batiuk
Associate Director for Science
Chesapeake Bay Program
U.S. Environmental Protection Agency

December 8, 2014

Focus on Space and Time!



Bay Dissolved Oxygen Criteria

Minimum Amount of Oxygen (mg/L) Needed to Survive by Species

Migratory Fish Spawning & Nursery Areas

Shallow and Open Water Areas

Deep Water

Deep Channel

6

5

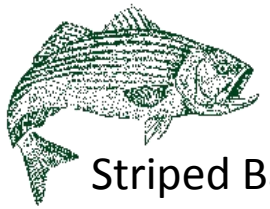
4

3

2

1

0



Striped Bass: 5-6

American Shad: 5

White Perch: 5

Yellow Perch: 5

Hard Clams: 5

Alewife: 3.6

Crabs: 3

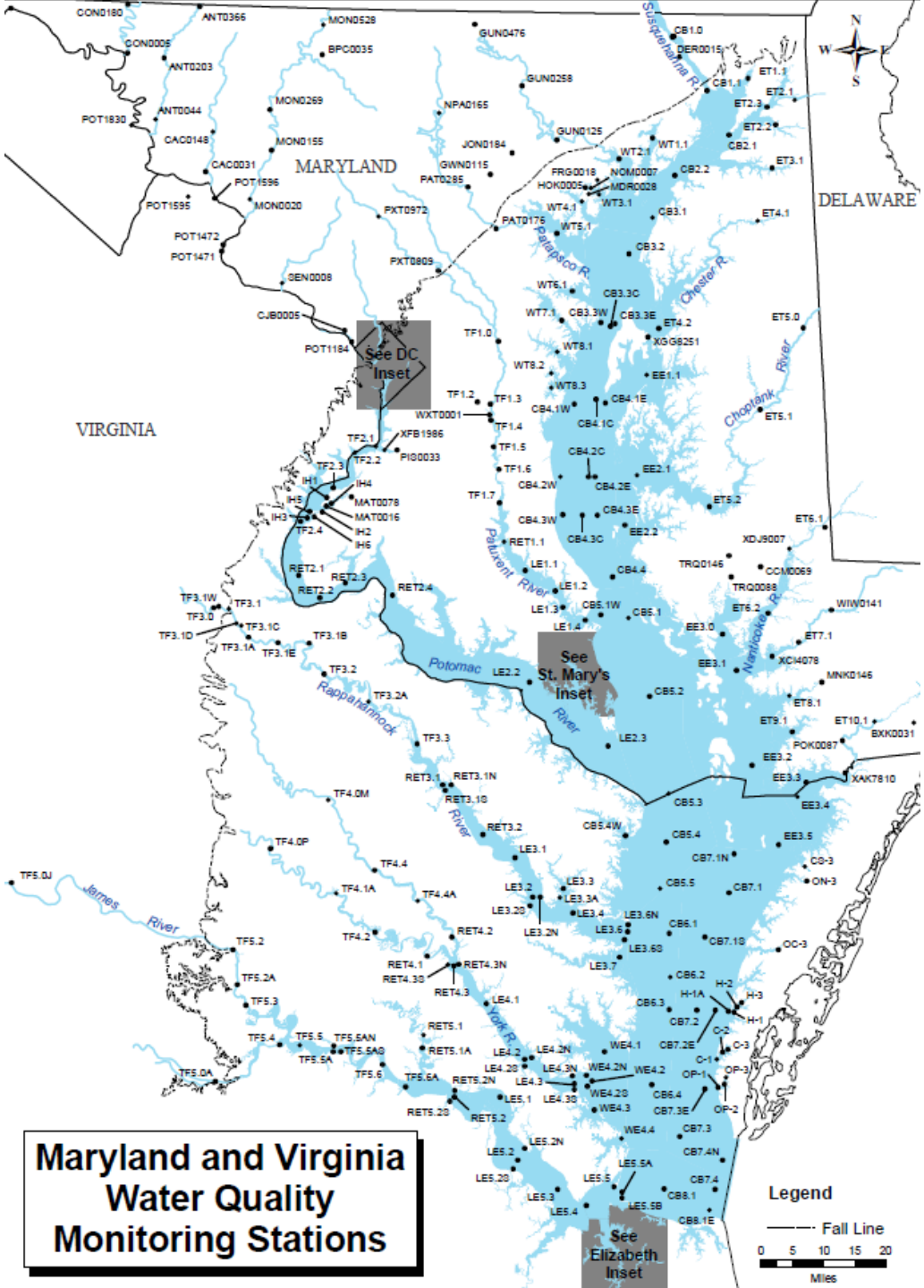
Bay Anchovy: 3

Spot: 2

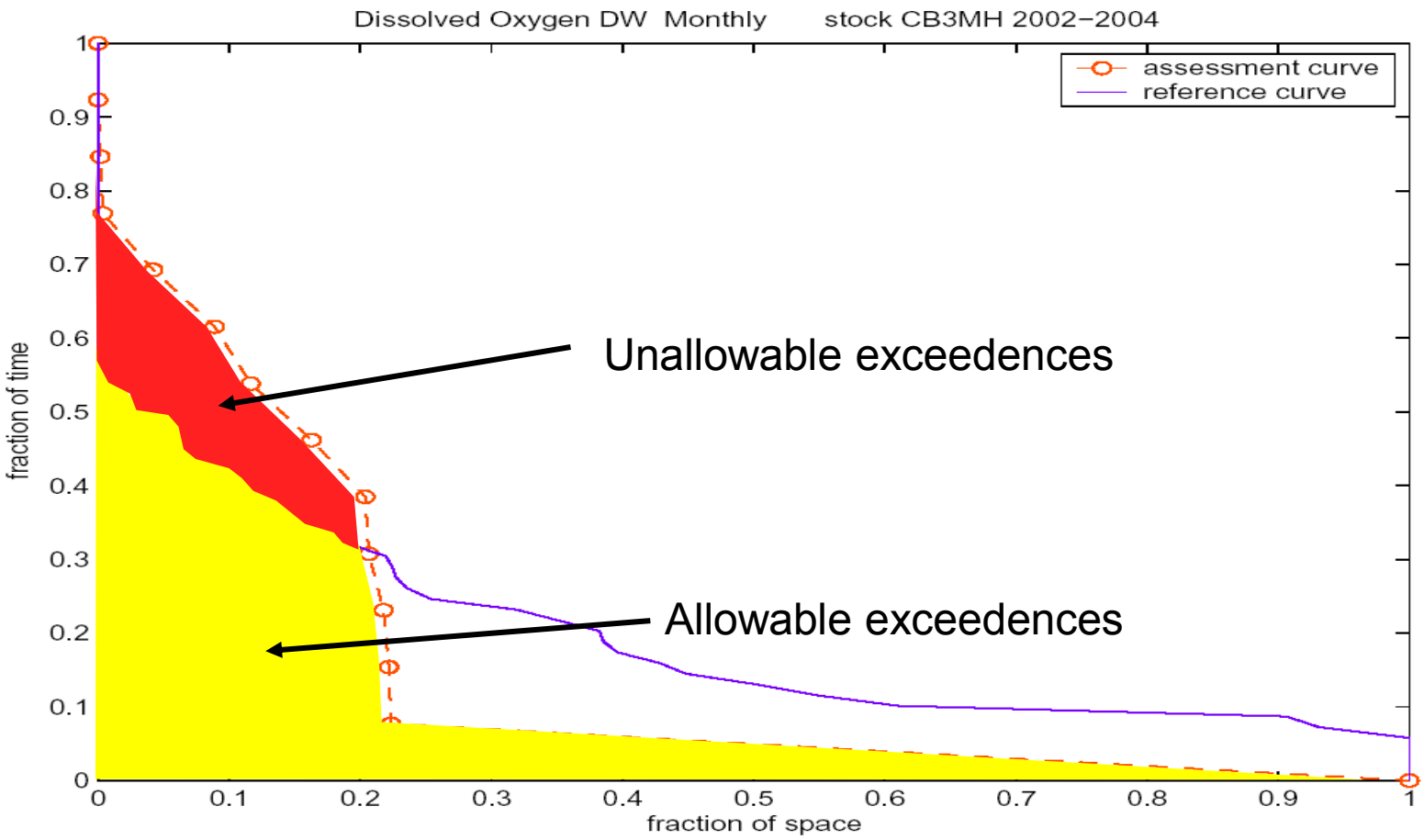
Worms: 1

Chesapeake Bay Water Quality Criteria

Tidal Water Designated Use	Dissolved Oxygen (milligrams per liter)	Chlorophyll a (micrograms per liter)	Water Clarity (% surface light) (acres of SAV)
Migratory Fish Spawning and Nursery (Feb. – May)	6 mg/L (7-day mean) 5 mg/L (instantaneous minimum)		
Shallow-water Bay Grasses (SAV growing seasons)	Open water criteria apply to shallow-water		Lower salinity: 13% Higher salinity: 22% CBP segment specific SAV Restoration acreages
Open-water Fish and Shellfish (year round)	5.5 mg/L in lower salinity waters and 5 mg/L in higher salinity waters (30-day mean) 4 mg/L (7-day mean) 3.2 mg/L (instantaneous min)	Narrative criteria 27.5 in tidal fresh and oligohaline waters	
Deep-water Seasonal Fish and Shellfish (June – Sept.)	3 mg/L (30-day mean) 2.3 mg/L (1-day mean) 1.7 mg/L (instantaneous minimum)		
Deep-channel Seasonal Refuge Use (June – Sept.)	1 mg/L (instantaneous minimum)		

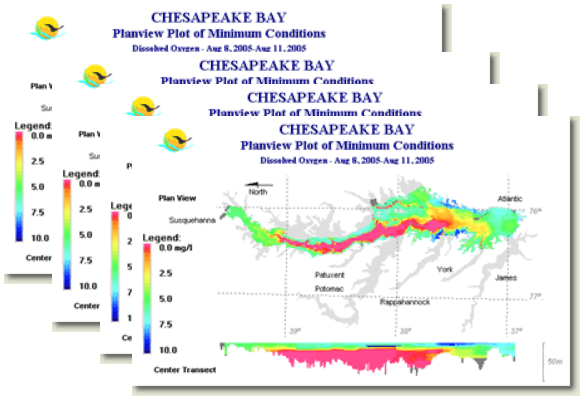

Maryland and Virginia
Water Quality
Monitoring Stations
MARYLAND
VIRGINIA
DELAWARE
See DC Inset
See St. Mary's Inset
See Elizabeth Inset
Susquehanna R.
Patapsco R.
Chester R.
Choptank River
Patuxent River
Potomac River
Rappahannock River
York R.
James River
Nanticoke R.
Legend
Fall Line
0 5 10 15 20
Miles
N
W
E
S

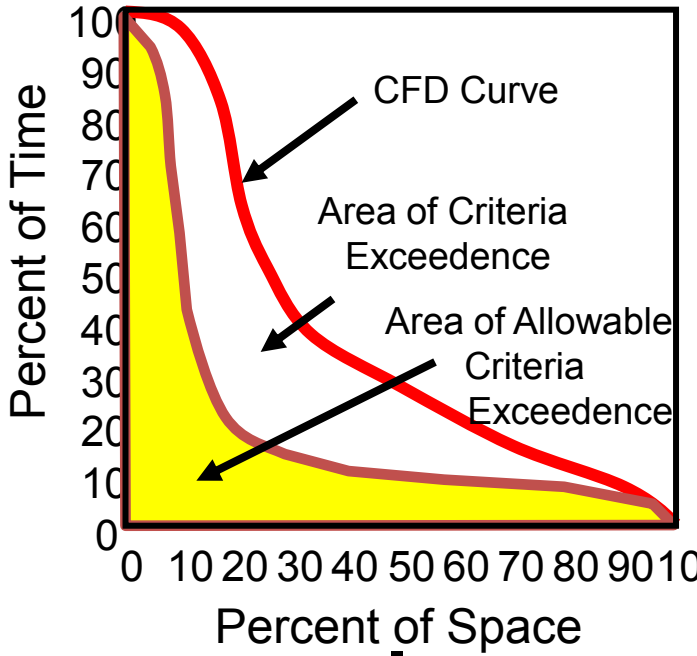
Cumulative Frequency Distributions are Key!

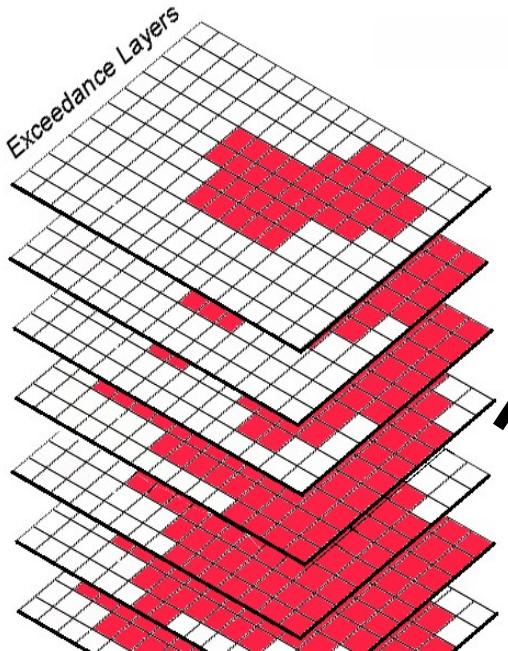


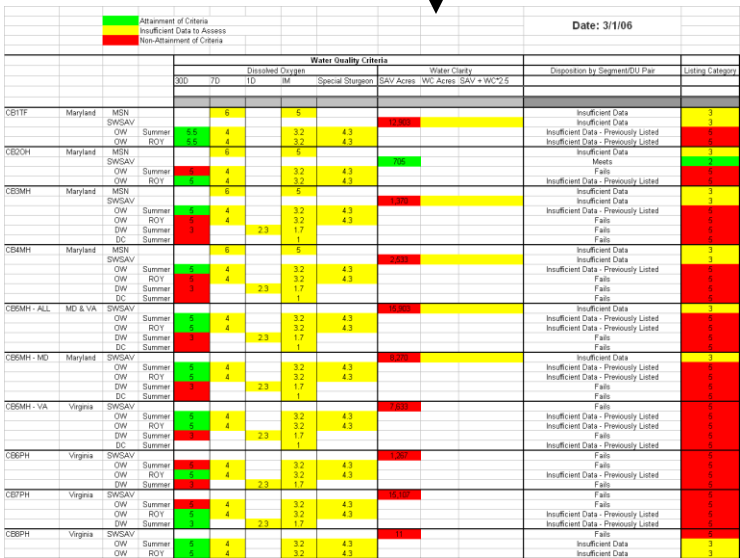
Addresses time, space, magnitude, duration, return frequency, and allowable exceedences

Criteria Assessment









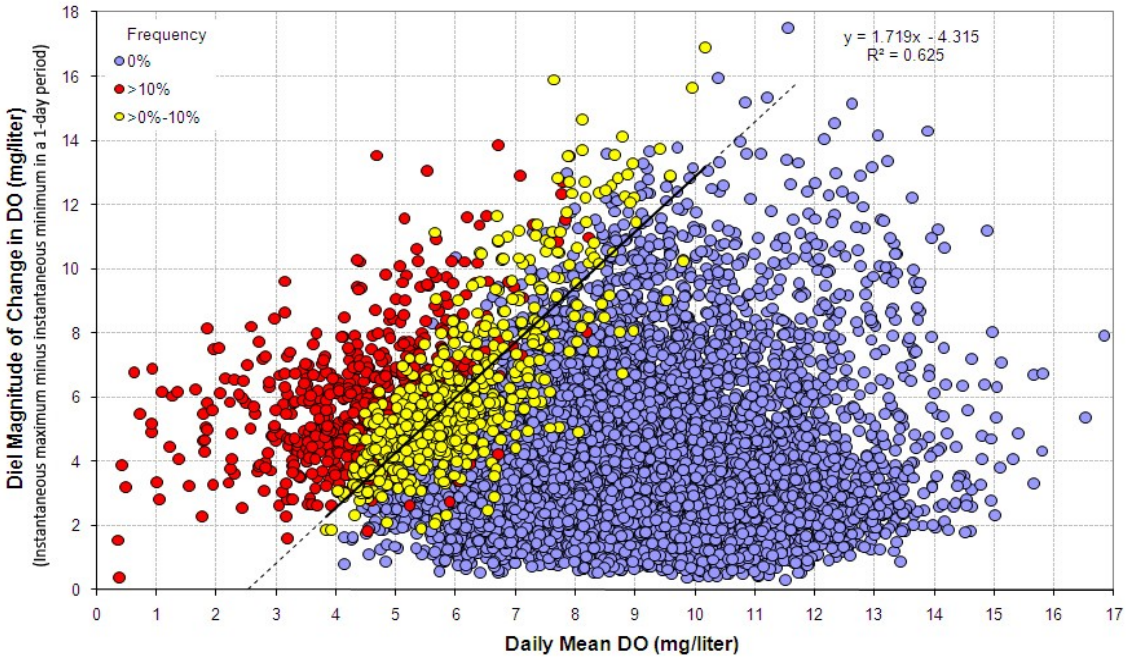
Drunken Sailor Monitoring !

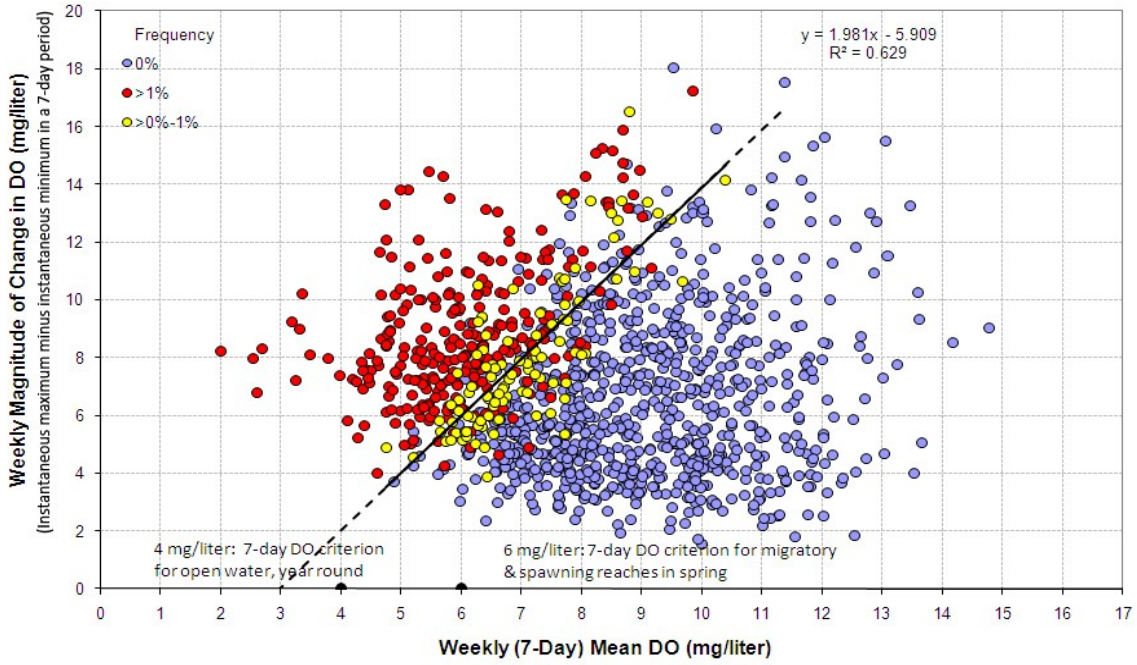
Courtesy of Ken Moore,
VIMS, and Smirnov Vodka


YAMAHA 150

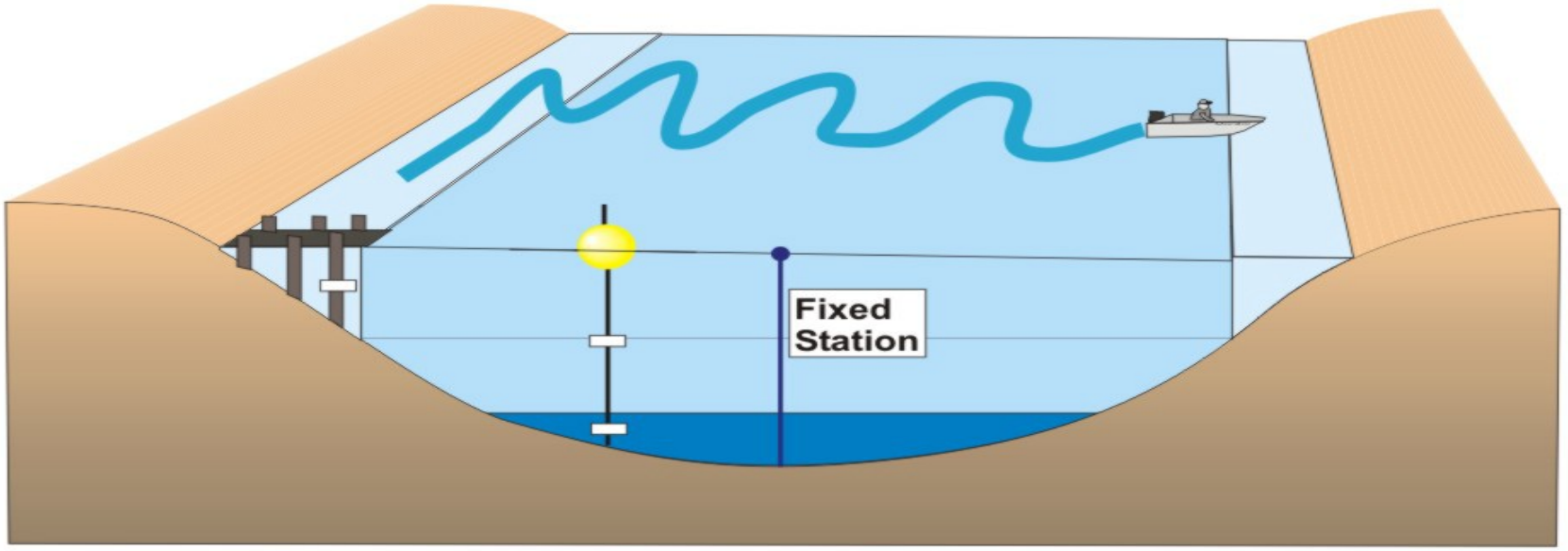
TIDAL POTOMAC SHALLOW WATER

Frequency of Observations Failing the Instantaneous Minimum DO Criteria

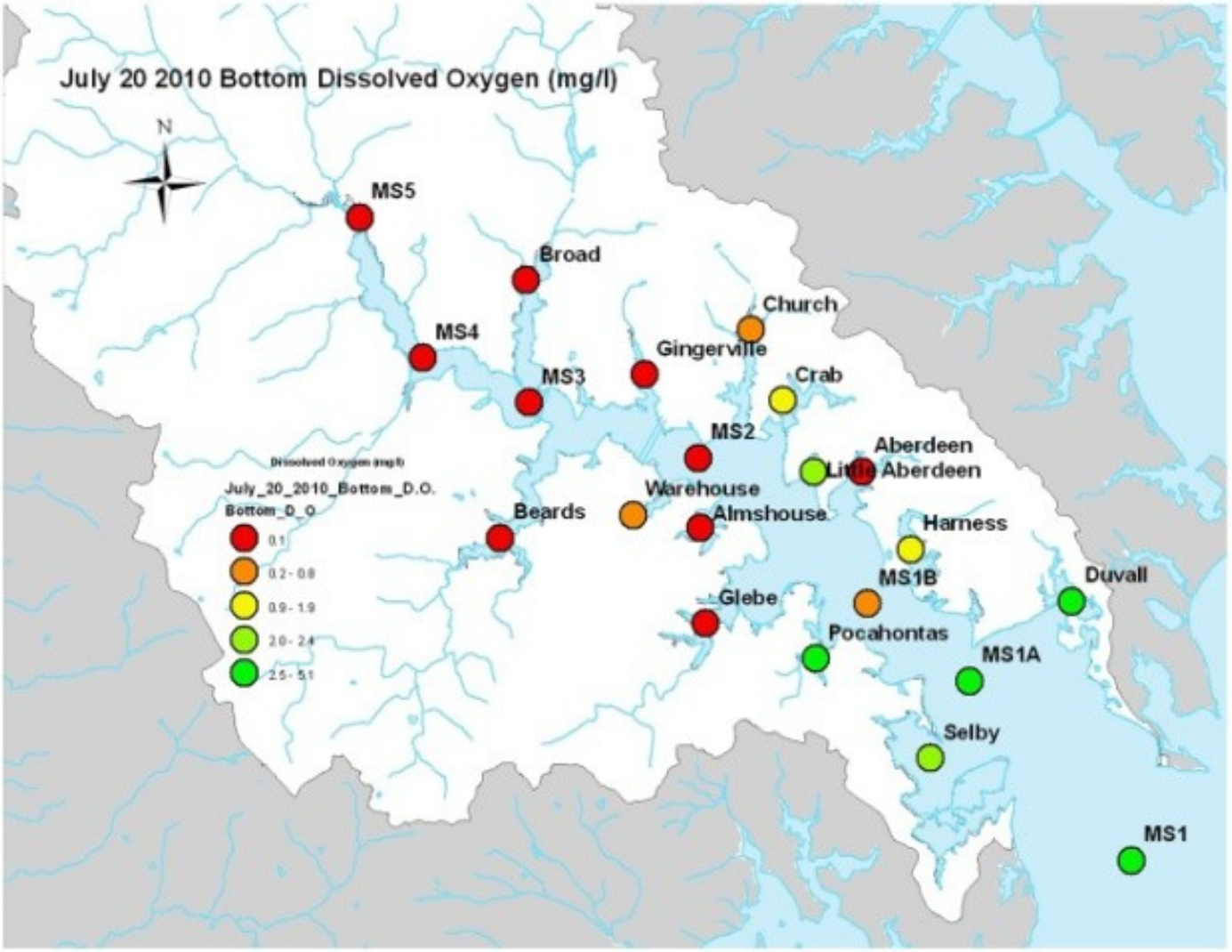


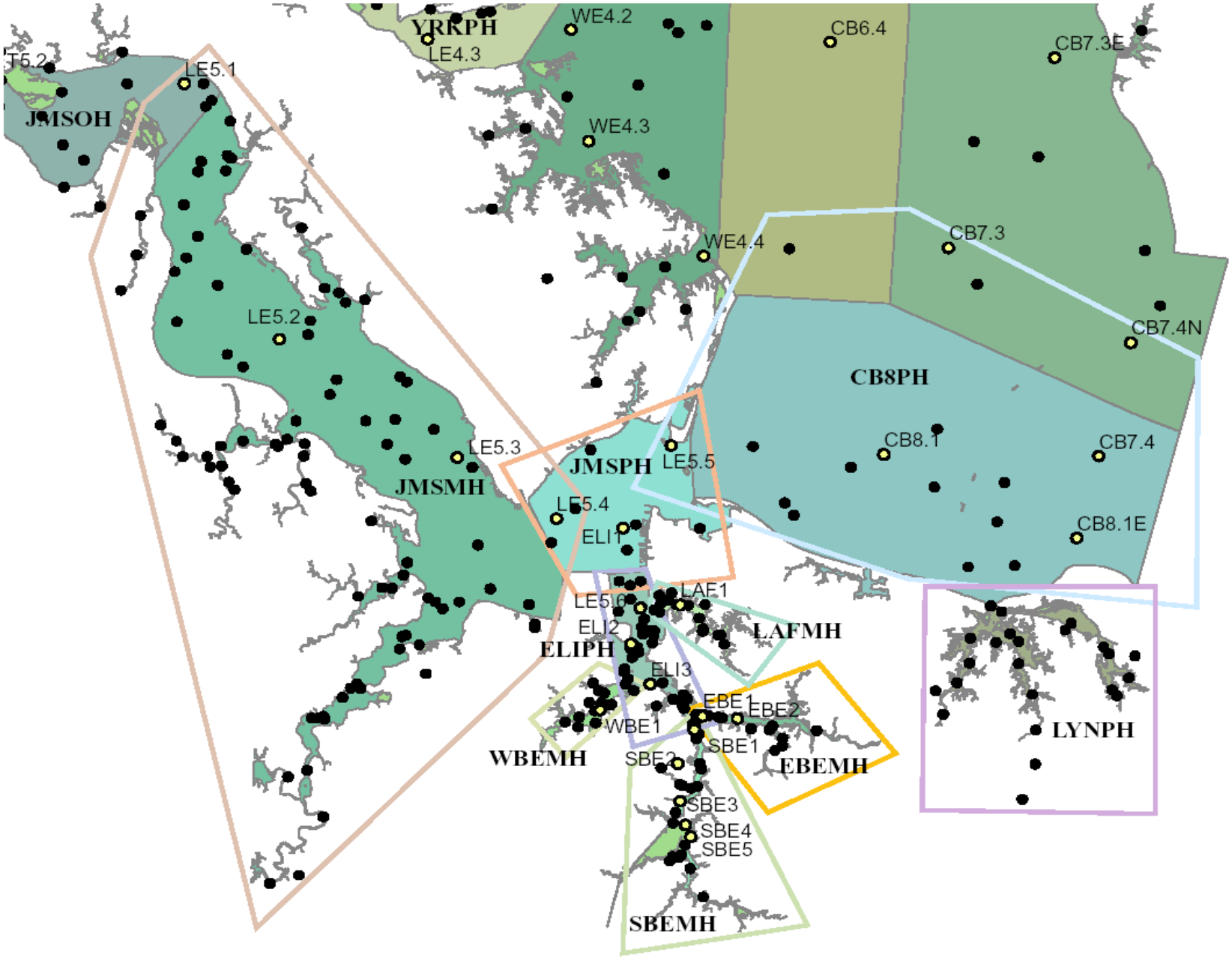


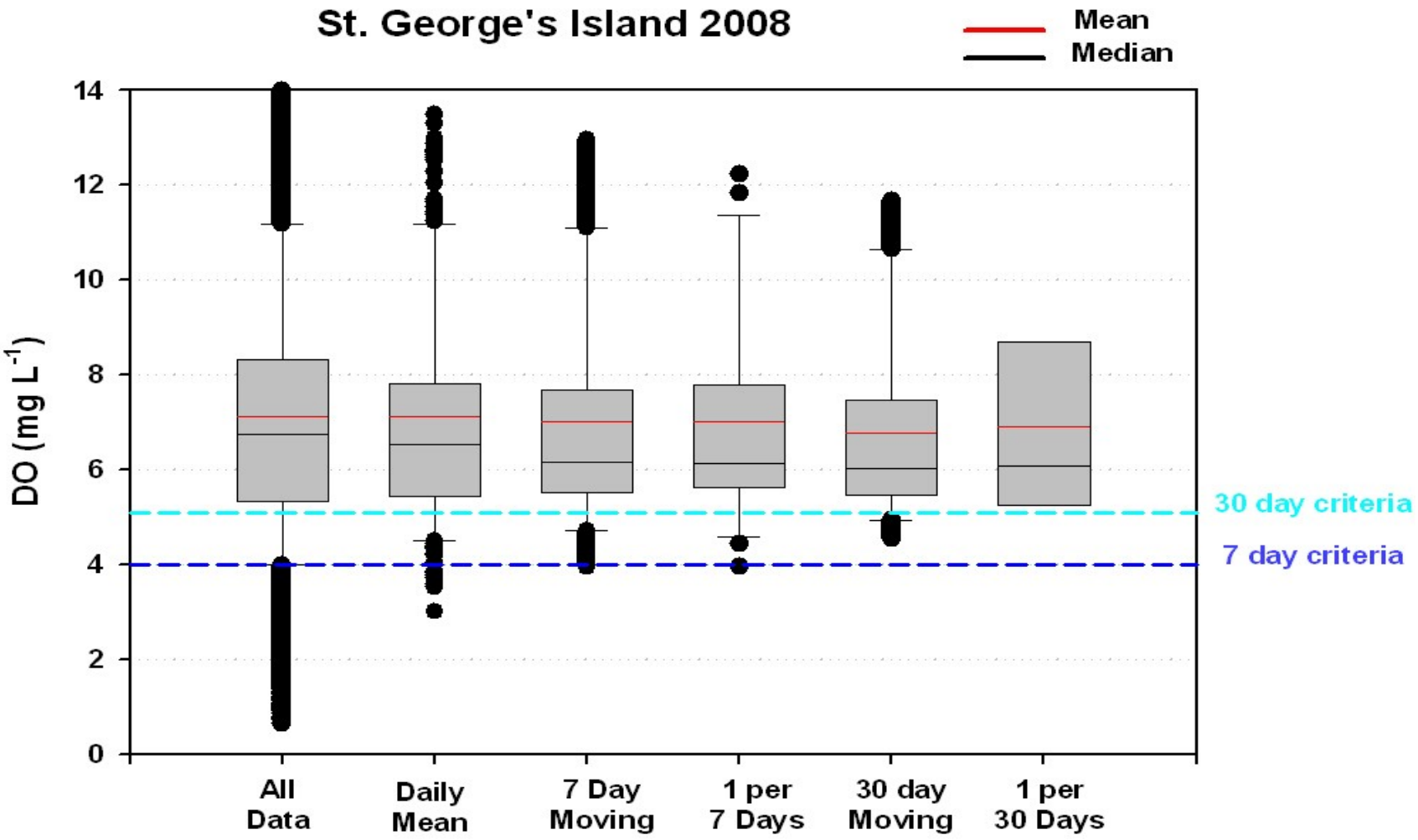
Fixed Stations, continuous sensors, in-situ sensors, towed sensors, autonomous systems…what's next?!



Integration of Citizens and Non-Traditional Monitoring Partners




T5.2
LE5.1
JMSOH
YRKPH
LE4.3
WE4.2
WE4.3
CB6.4
CB7.3E
WE4.4
CB7.3
CB7.4N
LE5.2
CB8PH
LE5.3
JMSMH
JMSPH
LE5.5
CB8.1
CB7.4
LE5.4
ELI1
CB8.1E
LAF1
LE5.6
ELI2
LAFMH
ELIPH
ELI3
EBE1
EBE2
WBE1
SBE1
WBEMH
SBE2
EBEMH
LYNPH
SBE3
SBE4
SBE5
SBEMH


St. George's Island 2008
Mean
Median
DO (mg L-1)
14
12
10
8
6
4
2
0
30 day criteria
7 day criteria
All Data
Daily Mean
7 Day Moving
1 per 7 Days
30 day Moving
1 per 30 Days

Bottomline:

Our focus on exceedences in time and space positions the Partners to take full advantage of innovative monitoring techniques

Goal:

Enhanced ability to fully assess the entire array of water quality criteria with increased confidence

Rich Batiuk

Associate Director for Science, Analysis and Implementation

U.S. EPA Chesapeake Bay Program Office

410-267-5731

443-223-7823 Mobile

batiuk.richard@epa.gov

www.chesapeakebay.net

Questions