Building And Sustaining Integrated Networks: BASIN

Bill Dennison

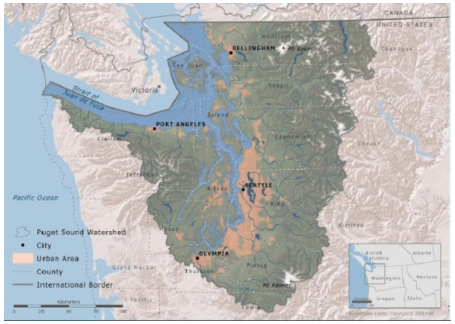
10 Jan 2013

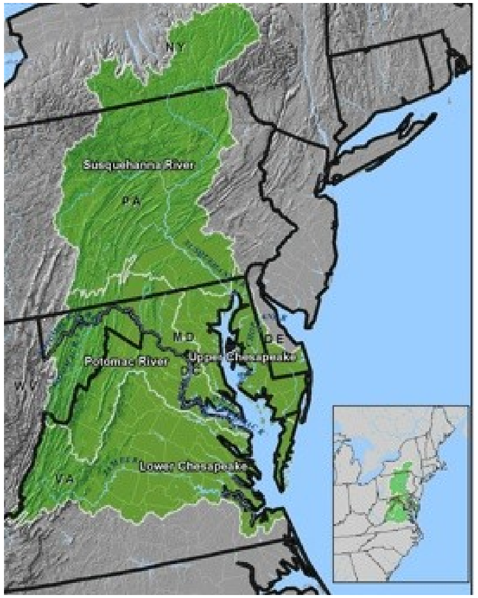
BASIN webinar series

- Dec 2013; Case studies = Puget Sound & Great Lakes
- Jan 2014; Case studies = MARACOOS, Upper Mississippi, Moreton Bay

Comparisons

Puget Sound	Chesapeake Bay	Great Lakes





Comparisons

	Puget Sound		Chesapeake Bay		Great Lakes
Area (mi^2)	2,642	0.6x	94,250	21x	94,250
Watershed Area (mi^2)	31,437	0.5x	201,460	3x	201,460
Volume (mi^3)	26.5	3.6x	7.3	750x	5,439
Population	4.2	0.3x	16	2.1x	33.5

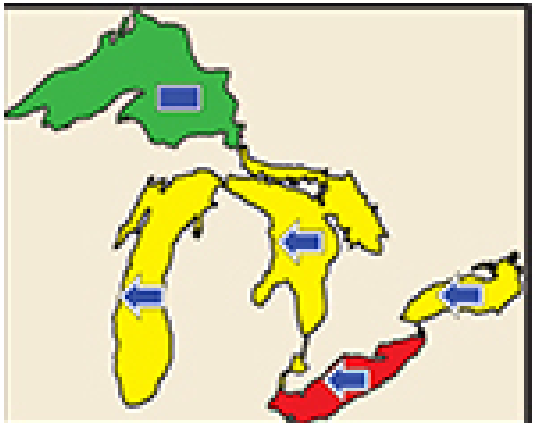
Monitoring comparisons

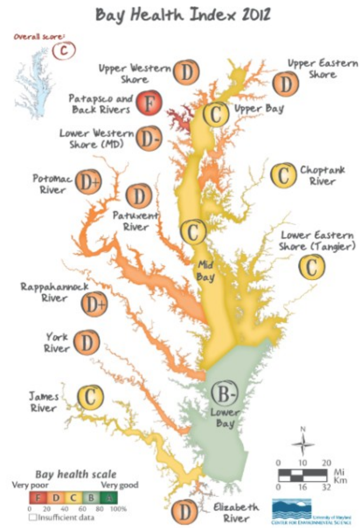
	Puget Sound	Chesapeake Bay	Great Lakes
Funding	State -> PSP	EPA -> DNR, etc.	EPA ->USGS
Reporting Indicators	21	7	(80)
Citizen Science	Pervasive Not Vital signs	Emerging Complementary	Minor component Charter boats

Comparison discussion

- Recommended terminology; instead of "monitoring" use "intelligence gathering"
- Funding insecurity common
- Need to connect monitoring results to management actions
- Broad engagement; multiple stakeholders
- Mixed results; some indicators improving, some degrading

Reporting frameworks





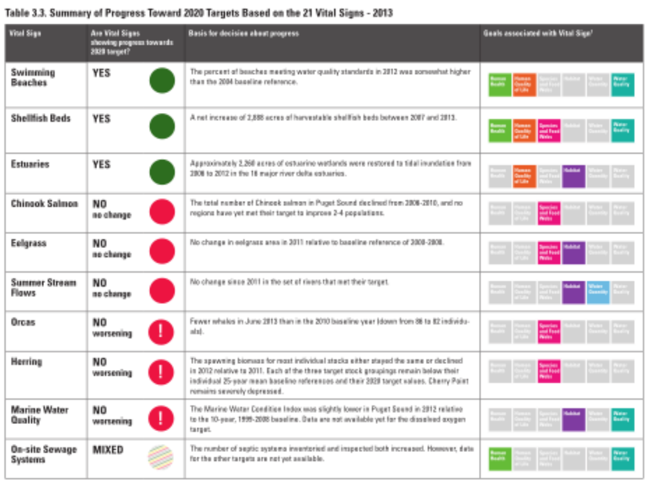
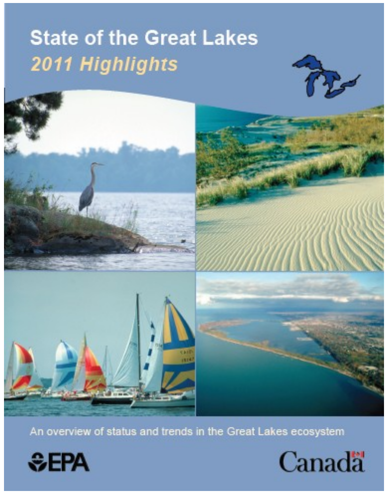
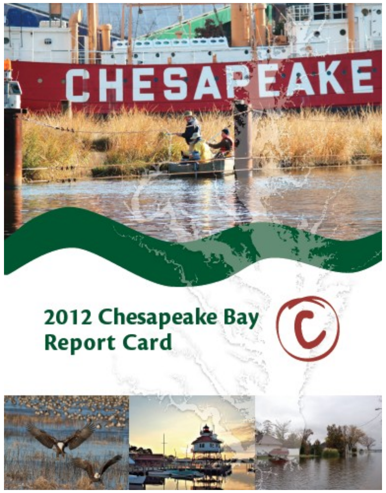


Table 3.3. Summary of Progress Toward 2020 Targets Based on the 21 Vital Signs - 2013

Vital Sign	Are Vital Signs showing progress towards 2020 target?	Basis for decision about progress	Goals associated with Vital Sign[1]
Swimming Beaches	YES	The percent of beaches meeting water quality standards in 2012 was somewhat higher than the 2004 baseline reference.	Human Health, Human Quality of Life, Water Quality
Shellfish Beds	YES	A net increase of 2,888 acres of harvestable shellfish beds between 2007 and 2013.	Human Health, Human Quality of Life, Species and Food Webs, Water Quality
Estuaries	YES	Approximately 2,260 acres of estuarine wetlands were restored to tidal inundation from 2006 to 2012 in the 16 major river delta estuaries.	Human Quality of Life, Habitat
Chinook Salmon	NO no change	The total number of Chinook salmon in Puget Sound declined from 2006-2010, and no regions have yet met their target to improve 2-4 populations.	Species and Food Webs
Eelgrass	NO no change	No change in eelgrass area in 2011 relative to baseline reference of 2000-2008.	Species and Food Webs, Habitat
Summer Stream Flows	NO no change	No change since 2011 in the set of rivers that met their target.	Habitat, Water Quantity
Orcas	NO worsening	Fewer whales in June 2013 than in the 2010 baseline year (down from 86 to 82 individuals).	Species and Food Webs
Herring	NO worsening	The spawning biomass for most individual stocks either stayed the same or declined in 2012 relative to 2011. Each of the three target stock groupings remain below their individual 25-year mean baseline references and their 2020 target values. Cherry Point remains severely depressed.	Species and Food Webs
Marine Water Quality	NO worsening	The Marine Water Condition Index was slightly lower in Puget Sound in 2012 relative to the 10-year, 1999-2008 baseline. Data are not available yet for the dissolved oxygen target.	Habitat, Water Quality
On-site Sewage Systems	MIXED	The number of septic systems inventoried and inspected both increased. However, data for the other targets are not yet available.	Human Health, Water Quality





Comparison paper

Developments in Ecosystems, volume 1
Edited by M.H. Wong

Chapter 1

A Comparison of Issues and Management Approaches in Moreton Bay, Australia and Chesapeake Bay, USA

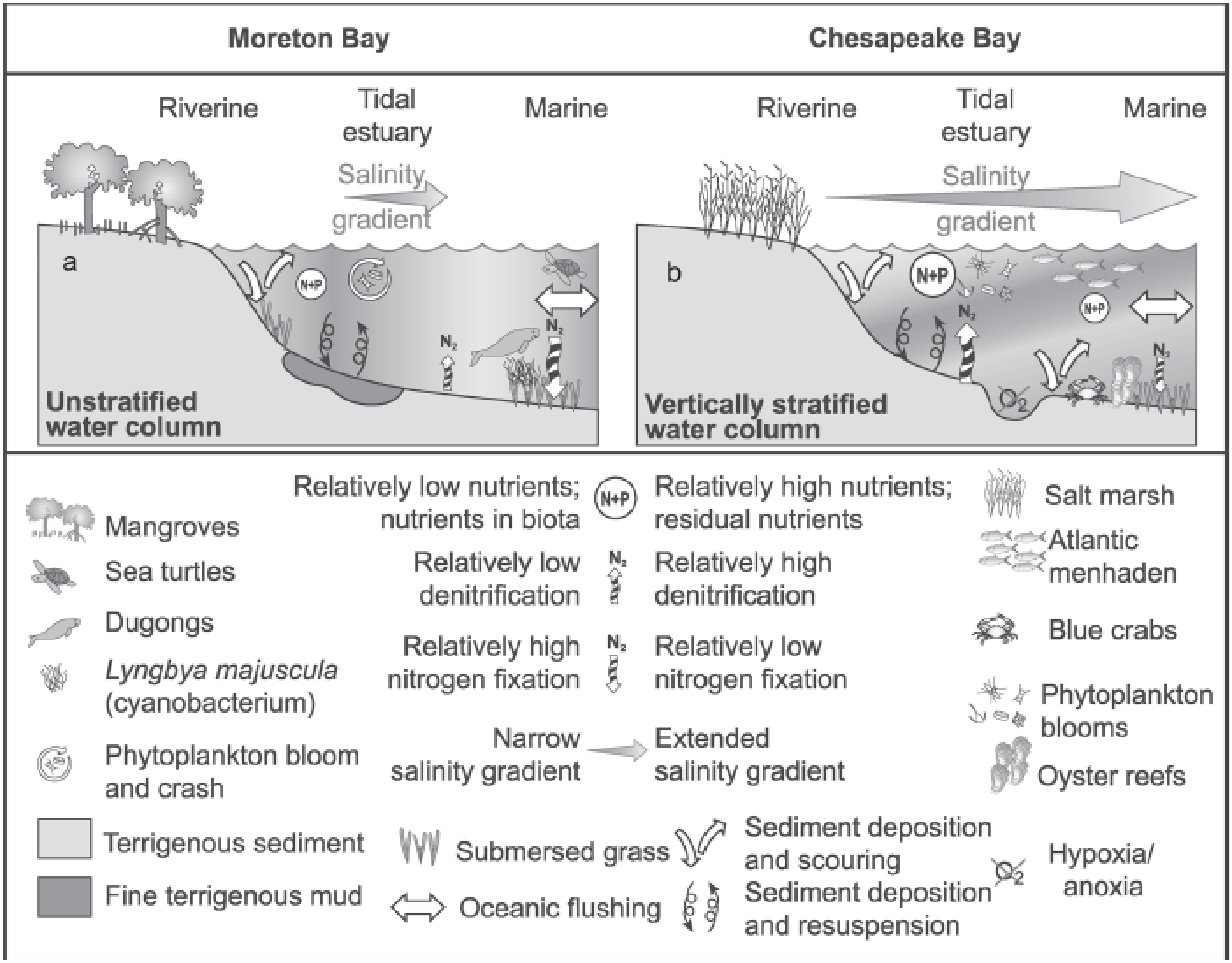
W.C. Dennison, T.J.B. Carruthers, J.E. Thomas and P.M. Glibert

Table 1: Comparison statistics for Moreton Bay and Chesapeake Bay.

	Moreton Bay	Chesapeake Bay
Latitude	27° S	38° N
Watershed area	21,220 km^2/8193 $mile^2$	165,800 km^2/64,000 $mile^2$
Bay area	1,523 km^2/588 $mile^2$	18,130 km^2/7000 $mile^2$
Watershed population	Approx. 1.5 million	Approx. 15 million
Average depth	6.8 m/22 ft	6.4 m/21 ft

Data from Dennison & Abal (1999), Horton (2003) and Skinner et al. (1998).

Comparison diagram



Agenda

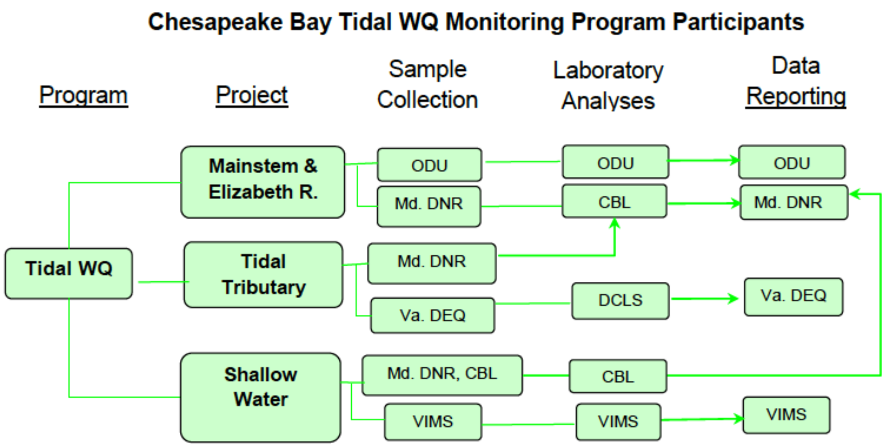
- **1:00** Welcome and Introductions *(Bill Dennison – STAR Chair, Mark Bennett – STAR Co-Chair, Peter Tango – STAR Coordinator)*
- **1:10** Bill Dennison, BASIN Overview
- **1:25** Dr. Gerhard Kusca, Executive Director of Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS)
- **1:55** Q&A of MARACOOS Program
- **2:05** Dr. Dave Hokanson, Water Quality Program Director, Upper Mississippi River Basin Association
- **2:35** Q&A of Upper Mississippi River
- **2:45** Dr. Simon Costanzo, Moreton Bay Ecosystem Health Monitoring Program/Great Barrier Reef monitoring
- **3:15** Q&A of Moreton Bay
- **3:25** Discussion integrating key points into Chesapeake Bay monitoring program
- **4:00** Adjourn

1. What are network objectives and design?

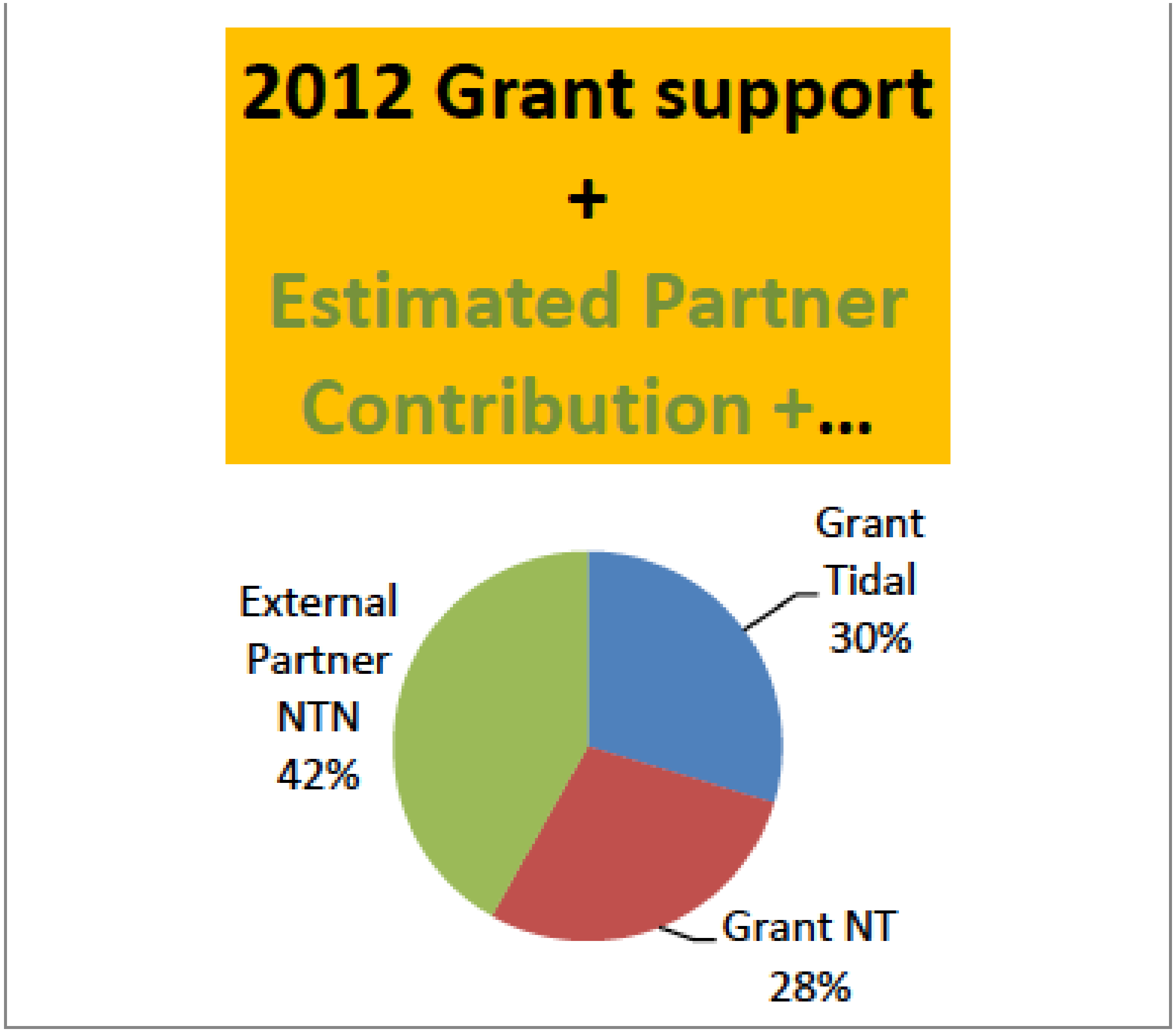
- Water quality: monthly, 150+ stations, 26 parameters
- Shallow water monitoring; 3 yr rotations
- Benthic infauna; fixed and random, annual
- Aquatic grasses; aerial photos, annual
- Fisheries independent surveys; annual
- Phyto and zooplankton; historical

2. Describe your operations model, including innovations

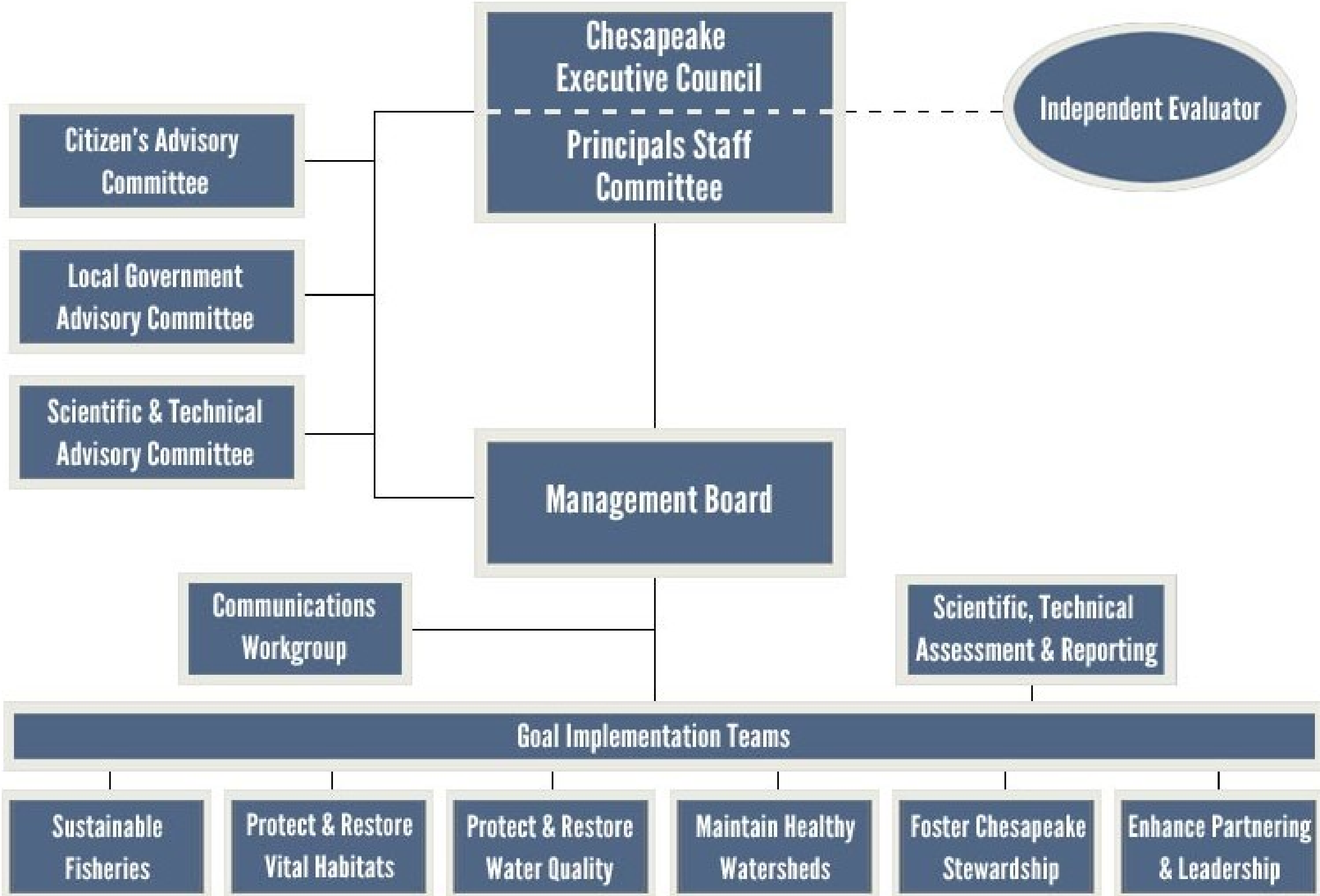
- DATAFLOW for underway sampling
- Vertical profilers
- Citizen scientists engaged (MTAC)
- Regular, qualitative remote sensing
- Highly evolved reporting, report cards, ‘stat-ing’



3. Describe your business model



4. What is your governance model?

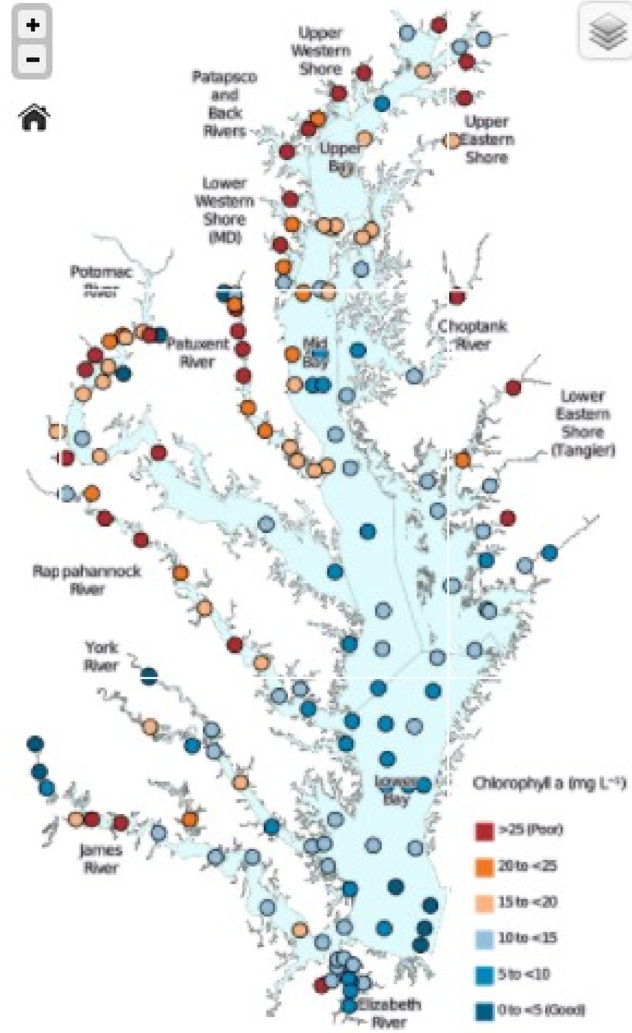


5. Describe successes and challenges

- Successes
  - Scientific basis for nutrient and sediment reduction strategy
  - Identified and tracked major inputs and impacts
  - Providing feedback on overall management effectiveness
- Challenges
  - Steady slow erosion of funding support
  - Realignment; tidal to nontidal
  - Recent major funding shortfalls

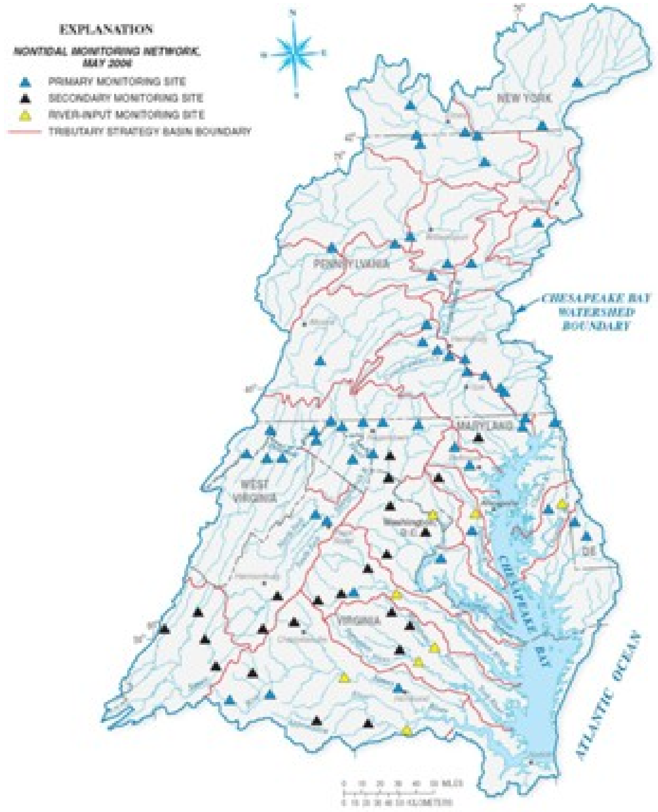
Institutional monitoring needed

- CBP sponsored monitoring provides the skeletal backbone of additional monitoring (e.g., citizen science monitoring)
- High quality, timely, accessible data with continuity is essential
- Piecemeal data does not replace integrated monitoring



Monitoring funding context

- Monitoring efforts have been curtailed over time; lean programs
- MRAT (Monitoring Realignment Action Team); 2009, ~$1 M reallocated from tidal to non tidal monitoring
- MRAT process -> Tidal & non-tidal better integrated

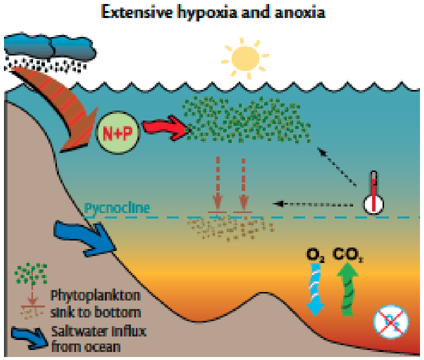


Effective monitoring requires significant resources

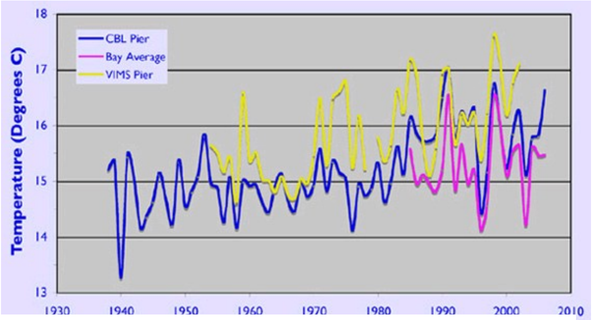
- Field work is expensive (people, equipment, vehicles, boats)
- Data analysis is time intensive (database development & maintenance, statistical analyses)
- Recurring costs are subject to inflationary pressures

Highlights from 25 years of tidal water quality monitoring program

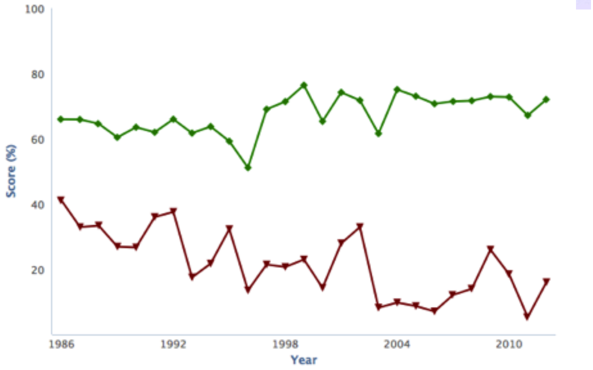
- Identification of eutrophication causes and impacts



- Climate trends and impacts (e.g., DO, SAV)

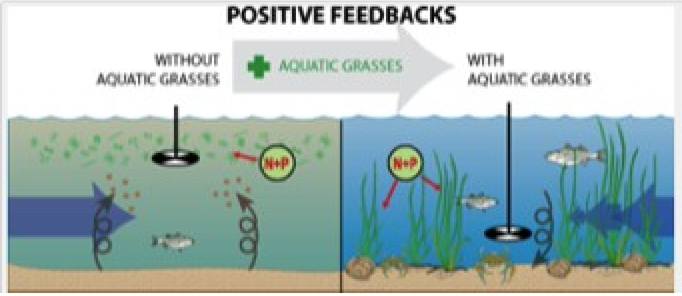


- Status and trends of key indicators (e.g., improving nutrients, degrading clarity)

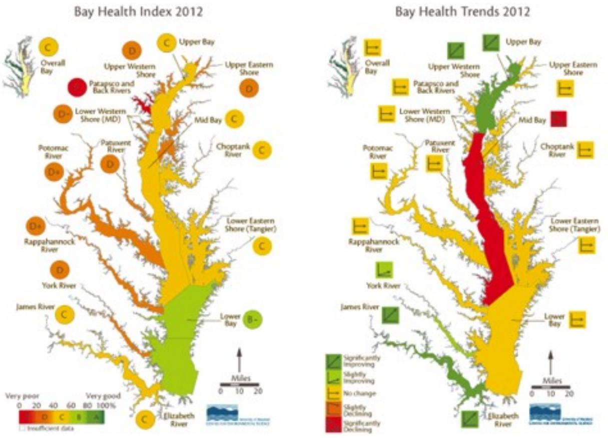


Highlights from 25 years of tidal water quality monitoring program

- Ecological thresholds ‘tipping points’ & feedbacks



- Input to report cards, Bay Barometer, research programs

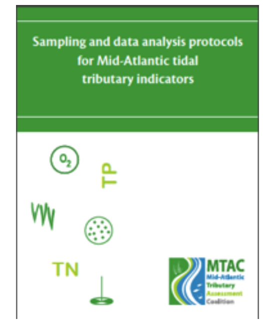


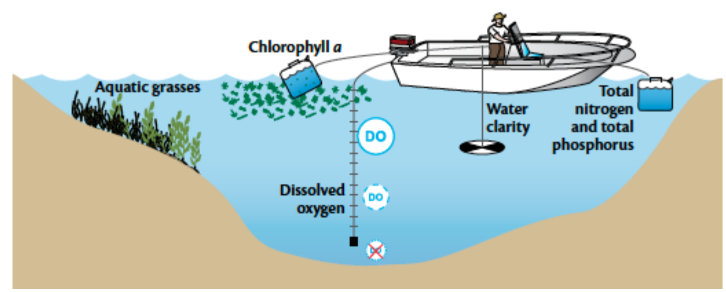
- Water quality criteria assessment

INTEGRATION & APPLICATION NETWORK

Citizen science can augment but CANNOT replace institutional monitoring

- Coordination needed
- Training needed; personnel turnover issue
- Continuity essential
- QA/QC issues
- There are some difficult and dangerous locations where trained personnel are needed

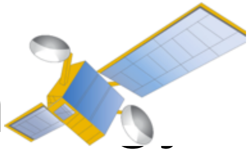




MTAC Mid-Atlantic Tributary Assessment Coalition

Technology can augment but CANNOT replace in situ sampling

- Purchase price of technology can be prohibitive
- Technology requires calibration, maintenance, operational costs
- Some features (e.g., nutrient samples) need to be sampled on site
- We are already using techn to augment monitoring as much as possible



STAC monitoring concerns

- ‘Monitoring for attainment’ focus needs to shift to ‘monitoring for adaptive management’ (What is working?)
- Integration of citizen science and modern technologies needs to occur
- Major monitoring overall likely necessary, not just minor tweaks
- New Bay Agreement should clearly articulate goals, outcomes, strategies to identify monitoring needs