BUILDING AND SUSTAINING INTEGRATED NETWORKS BASIN

UPDATE AND NEXT STEPS

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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
- New Bay Agreement should clearly articulate goals, outcomes, strategies to identify monitoring needs beyond water quality

BASIN Overview – Three Phase Process

- **Phase I (*complete*)** – Monitoring Review: Sustaining the Monitoring networks under a Federal Funding Gap in Program Support

- **Phase II (*in progress*):**

  1. Evaluation of a sustainable business model to support Chesapeake Bay and basin monitoring programs,
  2. Considering alternative approaches to the operation and design of the tidal and nontidal monitoring networks, and
  3. Assess the primary products that the monitoring program is expected to deliver to its customers.

  - **To include:** Case studies, STAR WQ monitoring workgroup discussions, examine customer expectations of the monitoring networks products
  - **Final Product of Phase II** – BASIN Water Quality Report

- **Phase III (*timeline TBD*)** – Expanded Monitoring in Support of the New Chesapeake Bay Agreement beyond Water Quality goals

Phase I: Findings/Implications

- Identified financial/operation thresholds below which the networks can't be sustained
- The Partnership must evaluate alternative monitoring network business and operations models in order to sustain our shared networks through 2025 to support the TMDL
- Phase I resulted in:
  - retaining all but four stations of the 126 station nontidal network for one more year.
  - In the Bay, one winter water quality cruise being cut and nutrients will not be collected during two summer cruises in both MD and VA. Additionally, there was no financial support available for the proposed benthic index of biotic integrity recalibration effort.

Phase II: Structure

Case Studies and WG discussions

Customer Expectations

1. Evaluation of a sustainable business model to support Chesapeake Bay and basin monitoring programs,

2. Considering alternative approaches to the operation and design of the tidal and nontidal monitoring networks, and

3. Assess the primary products that the monitoring program is expected to deliver to its customers.

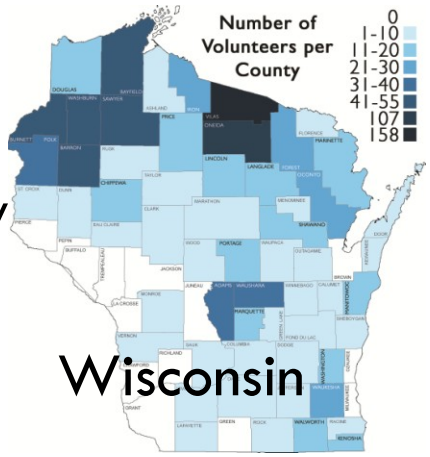
Phase II: Case Studies

Scale=(1/10 to 20X the Chesapeake)

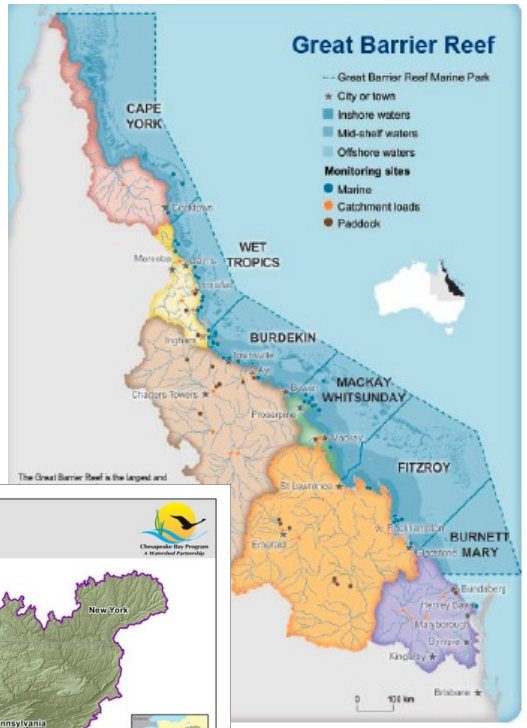
Great Lakes

Great Barrier Reef

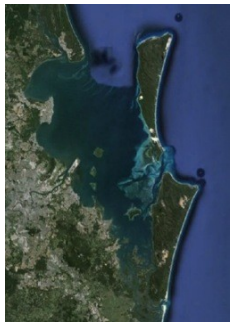
Puget Sound

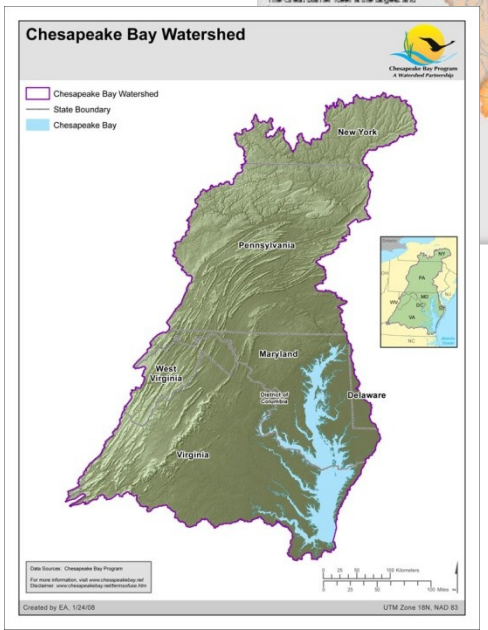


Wisconsin



Moreton Bay





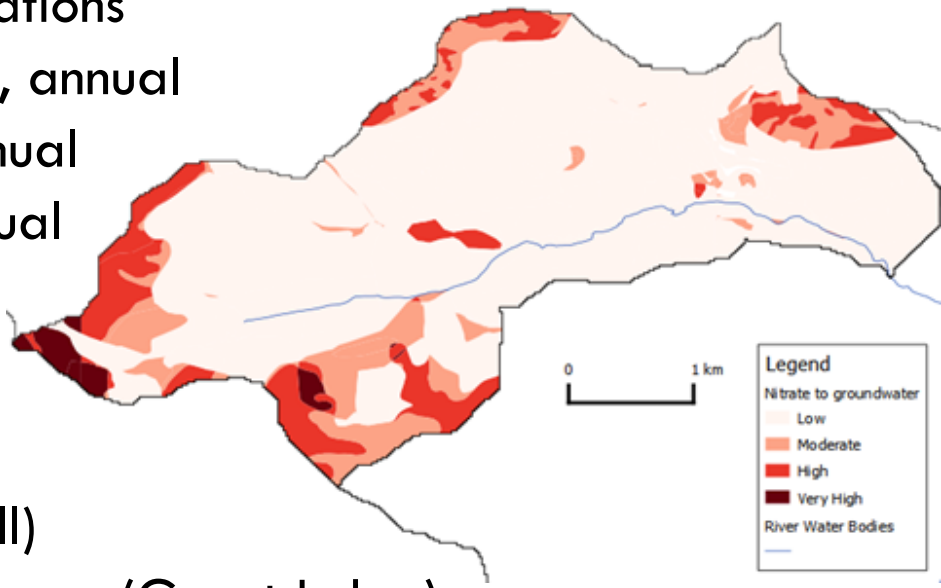
Ireland

Upper Mississippi River

What are the network objectives and design?

- **Chesapeake:**
  - 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

Pollution Impact Potential Map (Ireland)



- **Phase II Case studies:**
  - Water quality, habitat, fisheries (all)
  - Toxic Substances and Areas of Concern (Great Lakes)
  - Sewage plume tracking (Moreton Bay)
  - Pressure – State – Response (Great Barrier Reef)
  - Risk Assessments (Ireland)

Describe your business model

- **Business Models:**
  - Partner organizations provide significant matching funding (all)
  - Leveraged funds from multiple funding sources (MARACOOS)
  - Evolution toward 'user pays' (Moreton Bay)
- **Case Study Examples:**
  - Municipalities charged on a per capita basis (Moreton Bay)
  - Monitoring requirements imposed on individual permittees through the municipal stormwater permit (Puget Sound)
  - Under the terms of NOAA's annual Pacific Coast Salmon Recovery Fund Grant, 10% of all project funding must be spent for related monitoring. (Puget Sound)
  - Environmental Fund derived from levies on plastic bags and landfilling of waste - $90 Million in 2012 (Ireland)

Describe your operations model, including innovations and communication

- **Chesapeake:**
  - Long-term Tidal Water Quality Monitoring Network backbone
  - DATAFLOW for underway sampling
  - Fixed Station Continuous Sensors including Vertical profilers
  - Non-traditional partners (South River Federation, VIMS ChesMAPP)
  - Regular, qualitative remote sensing
  - Highly evolved reporting, report cards

- **Case studies:**
  - Technical capacity through agencies (all)
  - Citizen scientists engaged (all)
  - Vital Signs – Progress of Recovery Efforts (Puget Sound)
  - Divided into three monitoring programs: Surveillance, Operational, and Investigative (Ireland)

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

Citizen science can augment but CANNOT replace institutional monitoring

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

Wisconsin Citizen-Based Lake Water Quality Monitoring:

New Volunteer Costs

Type of Monitoring	Startup Cost Per Volunteer	Number of new Volunteers per year	Annual startup costs
Secchi	$50	100*	$5,000
Chemistry	$375	20	$7,500
Native Plant	$100	5	$500
Aquatic Invasive Species	$65	Up to 200	$13,000**
Temp profile	$130	20	$2,600
Dissolved Oxygen	$60	20	$1,200

Wisconsin Citizen-Based Lake Water Quality Monitoring:

Maintenance Costs for 2013

Type of Monitoring	Annual Maintenance Cost per volunteer, site or lake	2013 counts: volunteers, sites or lakes	Approx. annual cost to Maintain Volunteers
Secchi	$5 per volunteer	1124 volunteers	$5,620
Chemistry (lab, postage, replacement equipment, etc.)	$200 per site	549 sites	$110,000
Native Plant	$25 per lake	30 lakes	$750
Aquatic Invasive Species***	$5 per lake	300 lakes	$1,500
Temp profile	$5 per lake	523 lakes	$2,615
Dissolved Oxygen	$30 per lake	361 lakes	$10,830

Phase II Ongoing: Workgroup Discussions and Customer Expectations

- STAR WQ Workgroup Discussions:
  - Monitoring the Mainstem of the Bay focused on achieving more accurate DO assessments
  - Integration of non-traditional partner data
  - Shallow water monitoring; future programming

- Customer Expectations:
  - To gain feedback on the usefulness of the products derived from the CBP Monitoring Networks

Phase III: Expand beyond Water Quality

- A cooperative effort between STAR and STAC to expand beyond water quality monitoring needs based on the priorities of the Chesapeake Bay Program Partnership/New Bay Agreement.
- Timeline TBD

For More information

www.chesapeakebay.net/basin