Responding to the PSC Request to Improve the CBP Monitoring Networks- Update

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Chesapeake Bay Program

Management Board Meeting

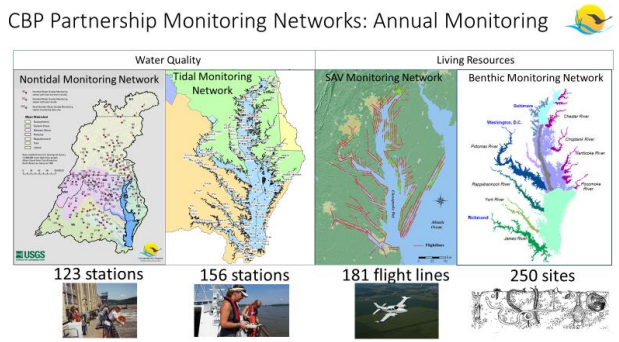
February 17, 2022

Why are we here?

- Preview of the upcoming Report and PSC presentation
  - Requested by the PSC about how to improve the CBP Monitoring Networks.

What are we asking for?

- Identify Opportunities to Address Monitoring Needs
  - Federal and state agencies use Infrastructure Law funding and other programs
- Invest and build the CBP monitoring capacity by 2025
  - Enhance the monitoring networks so the partners can tell the story of progress.



Key Findings

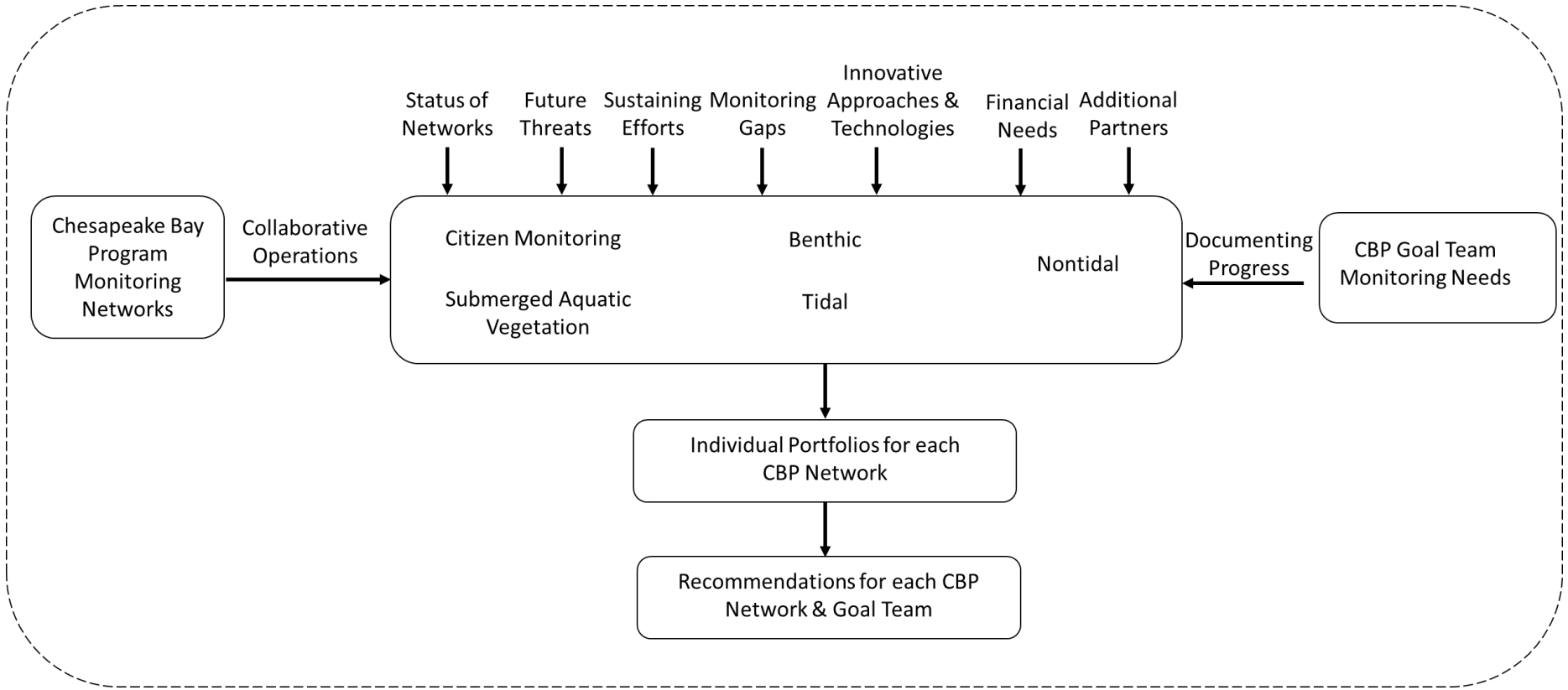
- Monitoring is critical
  - Monitoring shows CBP partners progress from water-quality and restoration efforts
  - Need to maintain and enhance existing CBP monitoring networks AND partner monitoring programs

- Monitoring for many CBP outcomes is insufficient
  - No segment of the bay has assessed all criteria, and therefore can't be delisted!
  - Some Outcomes need a more coordinated effort to track progress
  - Some Outcomes lack information to assess progress

- Opportunities for fundings exist
  - The CBP partners committed to achieving these outcomes have a unique opportunity to build monitoring capacity.

How did we get here?

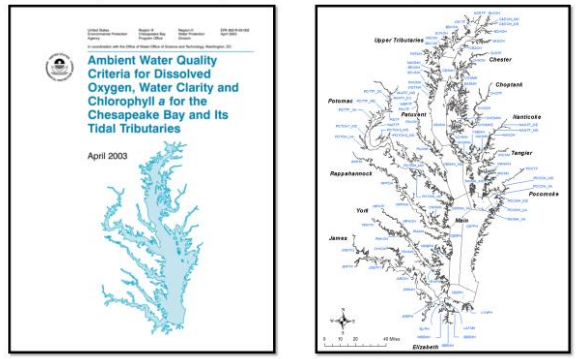
STAR-STAC team engaged multiple CBP partners and GITs to refine monitoring needs and develop recommendations.



Reporting Structure

- Investment recommendations and supporting information relate to **3 themes**:
  - Assessing tidal water quality standards to support living resources
  - Evaluate implementation priorities for watershed-based outcomes
  - Document CBP progress toward Watershed Agreement goals and outcomes

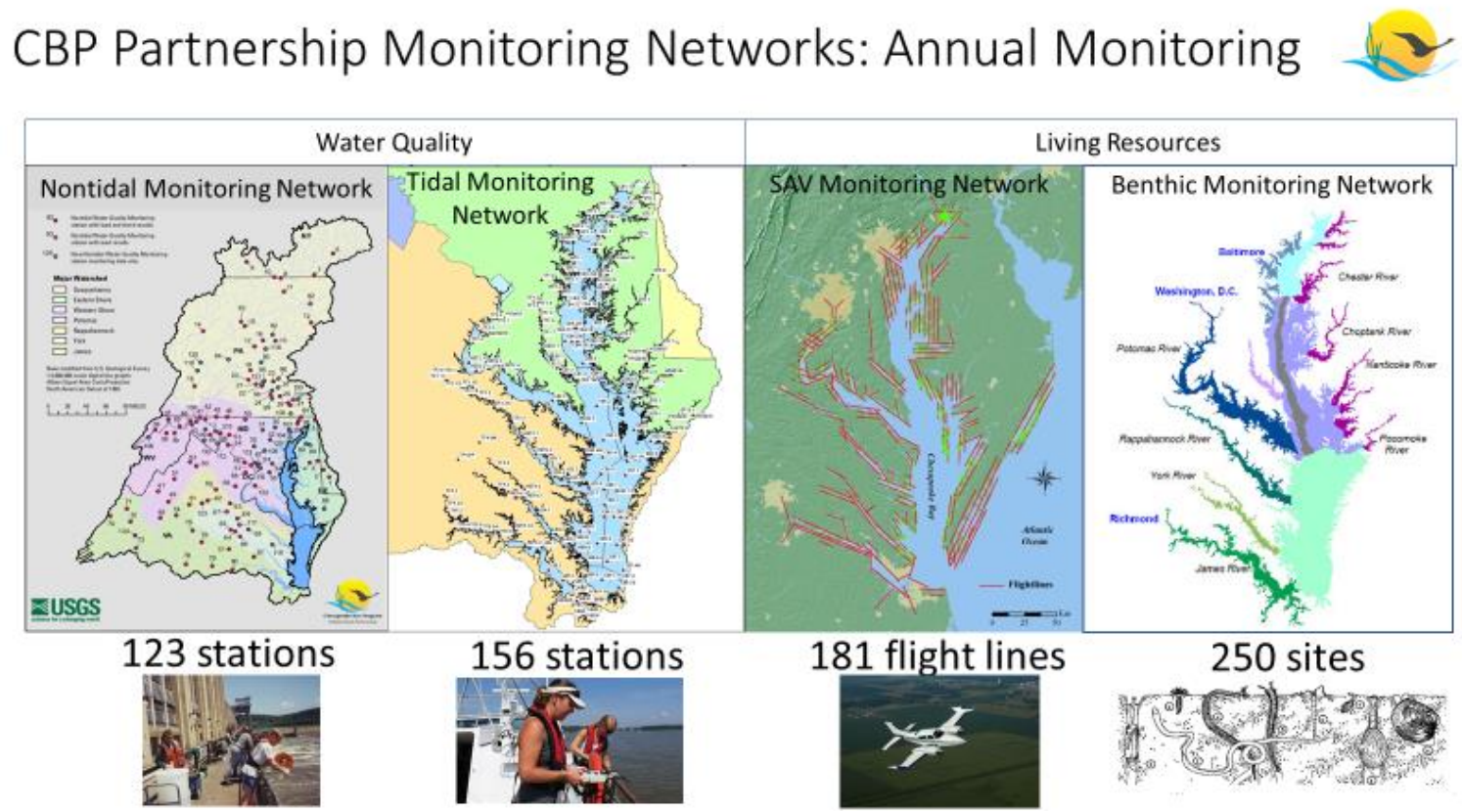
Chesapeake Bay Water Quality Standards



Report Overview: Supporting information behind developing the monitoring recommendations

- **Executive Summary**
- **Section 1**: Details behind network recommendations - Enhancing existing networks to meet water quality and selected CBP outcomes
- **Section 2**: Overview of monitoring needs and priorities for the Watershed Agreement Goals and Outcomes
- **Section 3**: An integrated Partnership approach to build monitoring capacity
- **Appendix**: Summary responses to the original 8 questions about the networks for the intelligence gathering in the review

Section 1: Enhancing CBP Networks



By the numbers:

Recommended investments to address monitoring needs

Total Investments Recommended: $5 M

Total Capital Investments: $1.7 M

Total Operation & Maintenance Investments: $3.3 M

Current PT 2/9/22

Network Portfolios:

Basis for recommendations

Each Portfolio contains:

- Status
- Gaps
- Current Investment
- Innovations
- Vulnerabilities
- Monitoring Gaps
- Recommendations
  - LINE ITEM expressed in overall recommendations

TIDAL LONG TERM WATER QUALITY NETWORK – BAY MONITORING

RECOMMENDATIONS

- $100,000. Operations. Support network sustainability and integrity. Annual cost to tidal network funding addressing existing cost of living impacts in MD, Yr 1. Additional growth of $80,000 each year required in Yrs 2-5.
- $600,000. Infrastructure. Enhance hypoxia network efficiency and capacity with One time purchase of equipment and supplies for 8 advanced vertical profile water quality monitoring stations.
- $300,000. Operations and maintenance. Support the expanded hypoxia monitoring network to address short duration water quality criteria assessment. +5% COLA adjustment annually.
- $233,000. Operations. Nutrient limitation annual survey. Verify predictions on management progress, calibrate bay model. +5% COLA annually.
- $90,000. Infrastructure. Annual cost. Design & implement the 4-D interpolator. Support water quality criteria attainment assessments.
- **Total Infrastructure investment need:** $690,000 initially, 90K per year through 2025 for 4D tool development and implementation.
- **Total Operations and maintenance annual investment need:** Yr $633,000, estimated growth of 100K more needed each year in Yrs 2-5.
  - Funding for data analysis and reporting are not included.

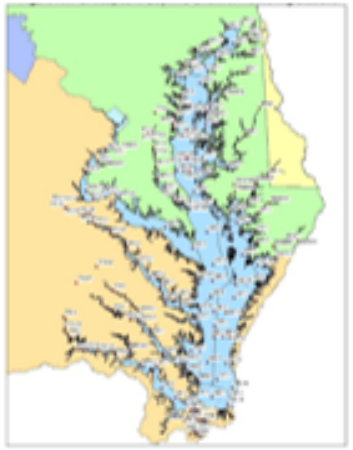


Figure 1. Tidal Bay Monitoring Program locations

STATUS:

- The current tidal monitoring network was established in 1984, its first full year was 1985. There are 154 active stations sampled for physical, chemical, and biological measures throughout the water column with baywide consistent collection and analysis protocols. One or more monitoring sites are located in each of the 92 Bay segments. Stations are sampled 1 or 2 times per month depending on location and season. Targeted sampling occurs in shallow water in a limited number of Bay segments each year either mapping surface water quality or providing continuous (i.e., every 15 minutes) water quality measures at one depth for a fixed location in a season. Advanced statistical analyses are used to report annual and seasonal trends.

VULNERABILITIES:

- Cost of living increases when funding remains unchanged leads to less buying power and decisions for reducing the size of the network.
- Winter weather influencing seasonal assessments

MONITORING GAPS:

- Short duration water quality (dissolved oxygen) criteria attainment assessment.
- Shallow-water monitoring representation.
- Annual full bay water clarity and chlorophyll measures and assessment

CURRENT INVESTMENT:

- Approximately $2.7M. Federal Clean Water Act 117e program funds which includes 1:1 matching support from grant partners.

INNOVATIONS:

- Robust, cost-effective continuous monitoring sensor units (vertical arrays) for open water, shallow and deep water, water column water quality monitoring. (oxygen, salinity and temperature)
- "Big data" management.
- Advanced statistical analyses

Network Portfolios:

Basis for recommendations

LINE ITEM

- A source for justification
- Categories for funding
- Timeline for 5 years on operation and maintenance costs

Tidal Example:

Total estimated investments: $2.08M

Infrastructure: $780K

O&M: 1.3M

Tidal Infrastructure Examples:

Hypoxia Monitoring arrays	600,000
AI interpretation of satellite imagery algorithm	80,000
Polygon algorithm of SAV beds	70,000
SAV Watchers database development	30,000

Tidal O&M Examples:

Recommendation	Year 1	Year 2
Vertical sensors arrays - operate/maintain	300,000	315,000
4D interpolator development and implementation	90,000	90,000
Nutrient Limitation survey calibrate and verify models	230,000	235,750
SAV Sentinel Site network	120,000	126,000
Benthic program Cost of living	30,000	30,600

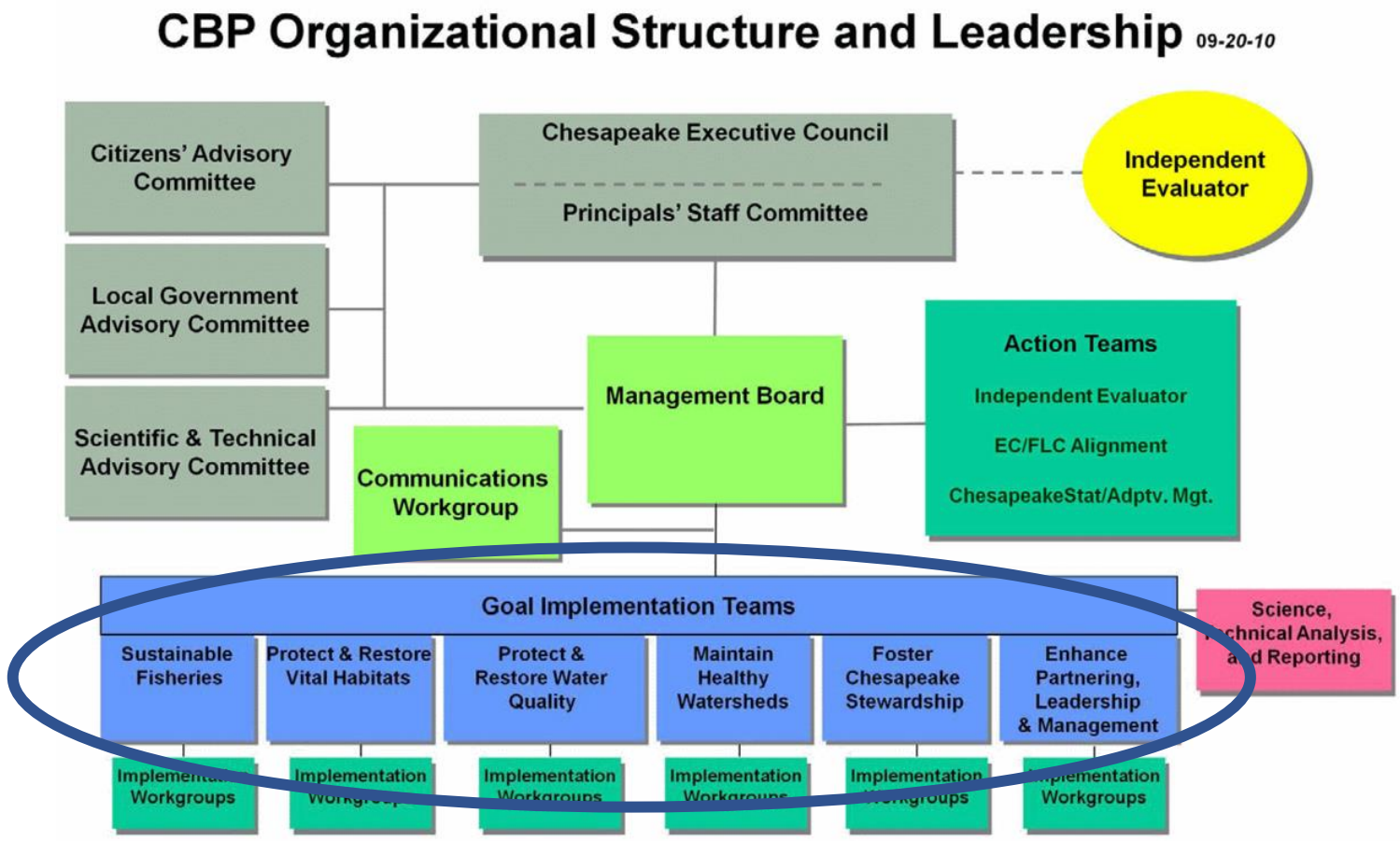
Recognize: There are some *network dependencies* in the recommendations.

Example: Addressing unassessed criteria in the bay.

- Long term WQ Monitoring
- Hypoxia Network
- 4D interpolator
- ConMon at RIM
- Benthic
- SAV

It is a package of interrelated needs.

Section 2: Monitoring Needs and Priorities for Goals and Outcomes



Maintain Success of Existing Monitoring Network

12 Outcomes

Examples
Blue Crabs
Oysters

Enhance Efficiency and Capacity of Monitoring Network

12 Outcomes

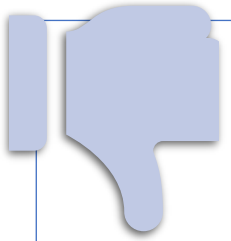
Examples
Wetlands
Stream Health

Establish a New Coordinated Monitoring Network

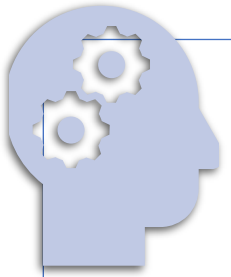
7 Outcomes

Examples
Climate
Local Leadership

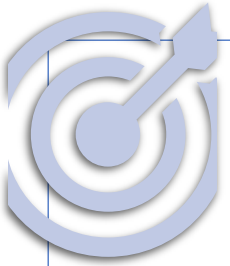
Enhance Monitoring for CBP Outcomes



Monitoring is insufficient for a majority of CBP Outcomes.

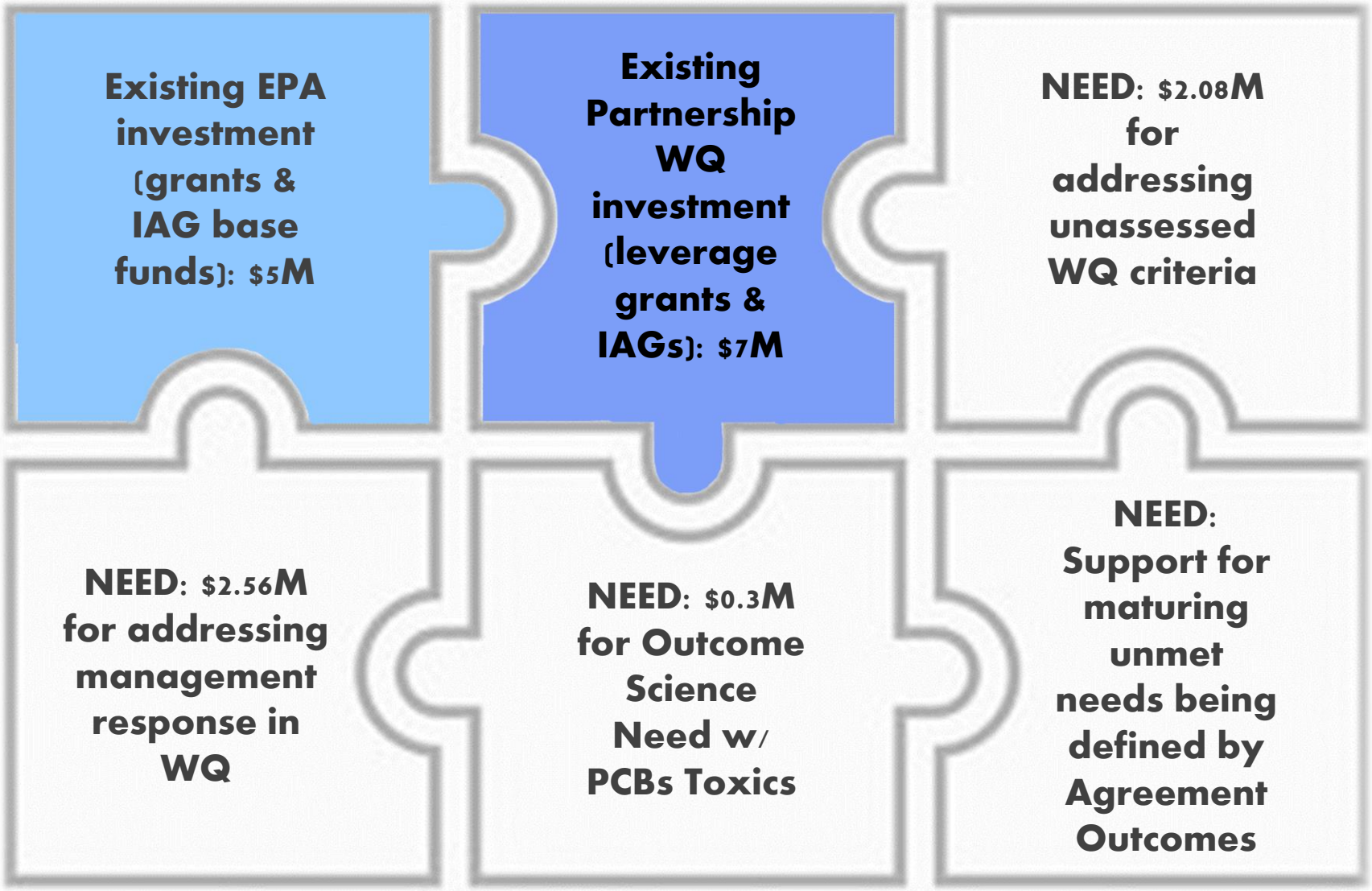


Monitoring Needs mature at different rates.



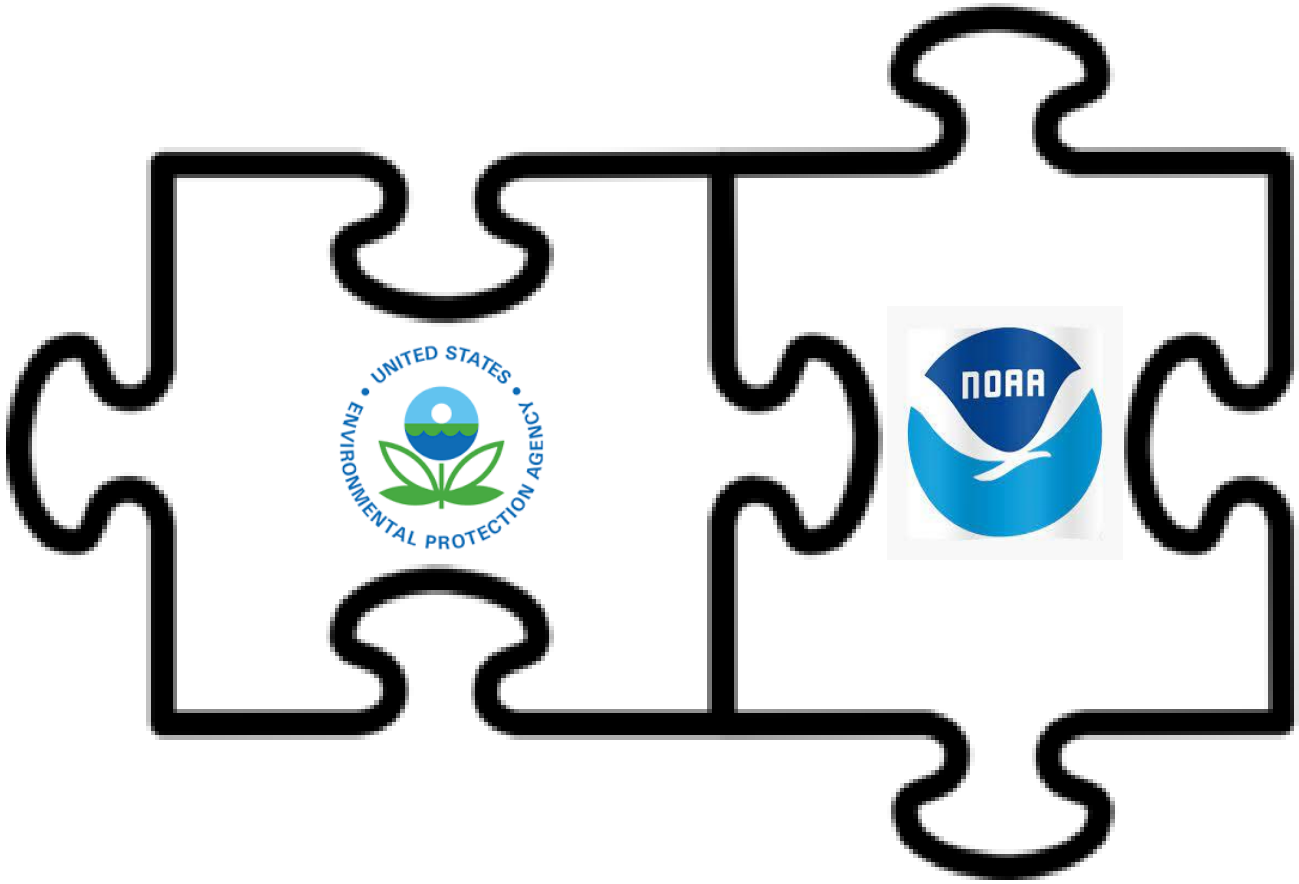
We will come back once needs are more constructed and have cost estimates to support them.

Section 3: Partnership Approach to Build Monitoring Capacity

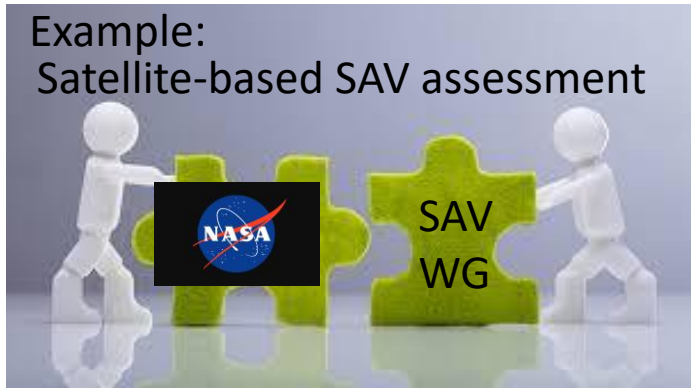


Need an *integrated partner approach* to invest in gaps.

Example: Hypoxia Network needs addressing unassessed bay criteria



Several partnerships are developing!



Example: Small Watershed Network needs addressing BMP effectiveness

Needs and Opportunities

- **We need to show we have assessments in place by 2025 for the 2014 Agreement.**

- **Partnership investment for menu of recommendations**
  - Address monitoring gaps
  - Fill knowledge gaps
  - Delist Waters
  - Track and Understand progress toward meeting goals and outcomes.

Identify recommendations from the menu to invest in to grow CBP monitoring capacity!

CBP NETWORK	RECOMMENDATION	CATEGORY	FUNDING				
			Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Tidal	Equipment and Supplies for 8 advanced vertical profile stations.	Infrastructure	$600,000				
Funder							
Tidal	Support operation and maintenance of vertical profiles.	Operation & Maintenance	$300,000	$315,000	$330,750	$347,288	$364652
Funder							
Nontidal	Equipment and supplies for 7 advanced continuous water quality monitoring stations at RIM stations	Infrastructure	$455,00				
Funder							
Nontidal	Support operation and maintenance of 7 new RIM continuous monitoring stations	Operation & Maintenance	$210,000	$214,200	$218,484	$222,854	$227,311
Funder							

A Partnership approach to turn red funding needs to GREEN!

CBP NETWORK	RECOMMENDATION	CATEGORY	FUNDING				
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Tidal	Equipment and Supplies for 8 advanced vertical profile stations.	Infrastructure	$600,000				
Funder			EPA				
Tidal	Support operation and maintenance of vertical profiles.	Operation & Maintenance	$300,000	$315,000	$330,750	$347,288	$364652
Funder			NOAA				
Nontidal	Equipment and supplies for 7 advanced continuous water quality monitoring stations at RIM stations	Infrastructure	$455,00				
Funder							
Nontidal	Support operation and maintenance of 7 new RIM continuous monitoring stations	Operation & Maintenance	$210,000	$214,200	$218,484	$222,854	$227,311
Funder							

For PSC – Next steps

- The report is expected to be completed by the end of March
  - Will be shared widely to CBP

- **Direct the Management Board to:**
  - Have federal and state agencies identify opportunities, using Infrastructure bill funding and other programs, to address identified monitoring needs.

  - Build the CBP monitoring capacity by 2025 so the partners can tell the story of progress and set new directions for the future.

Thank You!

Questions?

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Watershed monitoring support represented in STAR's PSC Monitoring Review recommendations

			Yr 1	Yr2	Yr3	Yr4	Yr5
Nontidal Network	Infrastructure	7 RIM Con-Mon sensor packages completes RIM network	455,000				
Nontidal Network	Infrastructure	3* Lower Susquehanna Reservoir input ConMons, PA USGS cost basis	126,000				
Nontidal Network	O&M	new 7 RIM ConMon network O&M	210,000	214,200	218,484	222,854	227,311
Nontidal Network	O&M	Lower Susquehanna Reservoir (Marietta) ConMon operation	120,000	122,400	124,848	127,345	129,892
Nontidal Network	O&M	PADEP funded through EPA	233,000	233,000	233,000	233,000	233,000
Nontidal Network	O&M	Station loss backfill annual risks coverage	45,000	45,000	45,000	45,000	45,000
Nontidal Network	Infrastructure	5 new Small Watershed ConMon locations. 6 sensor instrument	375,000				
Nontidal Network	O&M	Operating 5 new Small Watershed ConMon locations	150,000	157,500	165,375	173,644	182,326

2/15/22 PT draft.
Final edits are in progress