Chesapeake Bay Program

Science. Restoration. Partnership.

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

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Chesapeake Bay Program

Principal Staff Committee

March 2, 2022

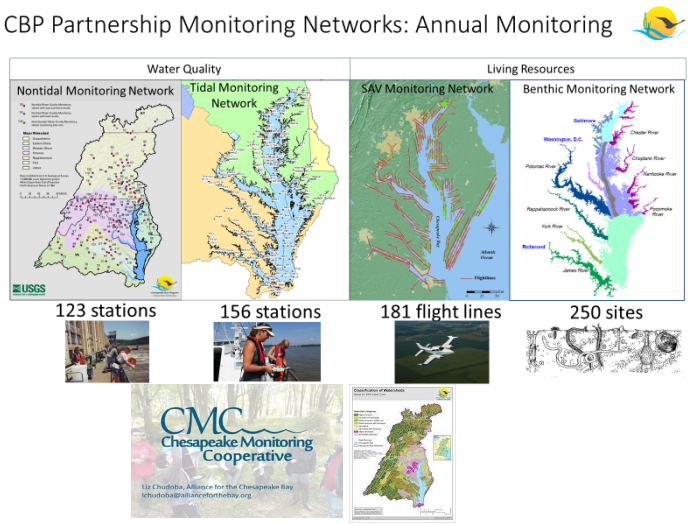
Why are we here?

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

2021-22 Monitoring review

- We started with a vision of understanding core network funding status and coincident capacity gaps.
- We developed recommendations to address capacity shortfalls.

Traditional networks



Investments address gaps and expand capacity

Monitoring and assessment capacity building beyond traditional monitoring

Investments address gaps and expand capacity

Full

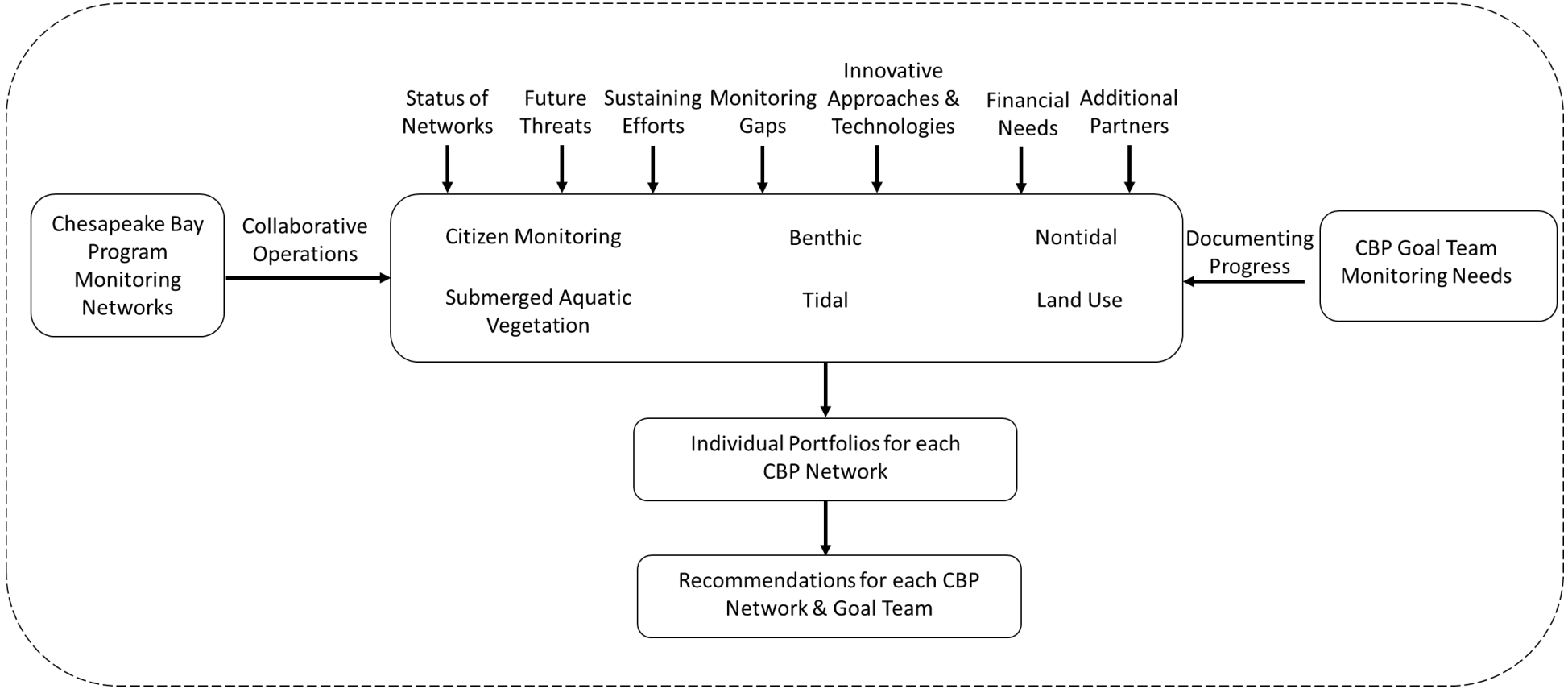
Water Quality Standards Attainment Assessment for Chesapeake Bay

+

CrossGIT Benefits

How did we get here?

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



Key findings

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

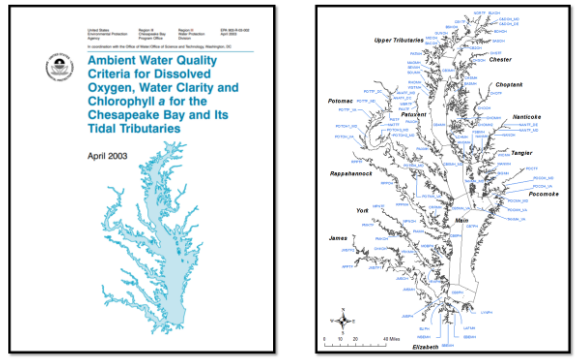
- Monitoring for many CBP outcomes is insufficient
  - No segment of the bay has assessed all water-quality criteria, and therefore can't be delisted!
  - Some Outcomes need a more coordinated effort to track progress
  - Some Outcomes lack information to assess progress

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

Capacity building recommendations developed around 3 themes

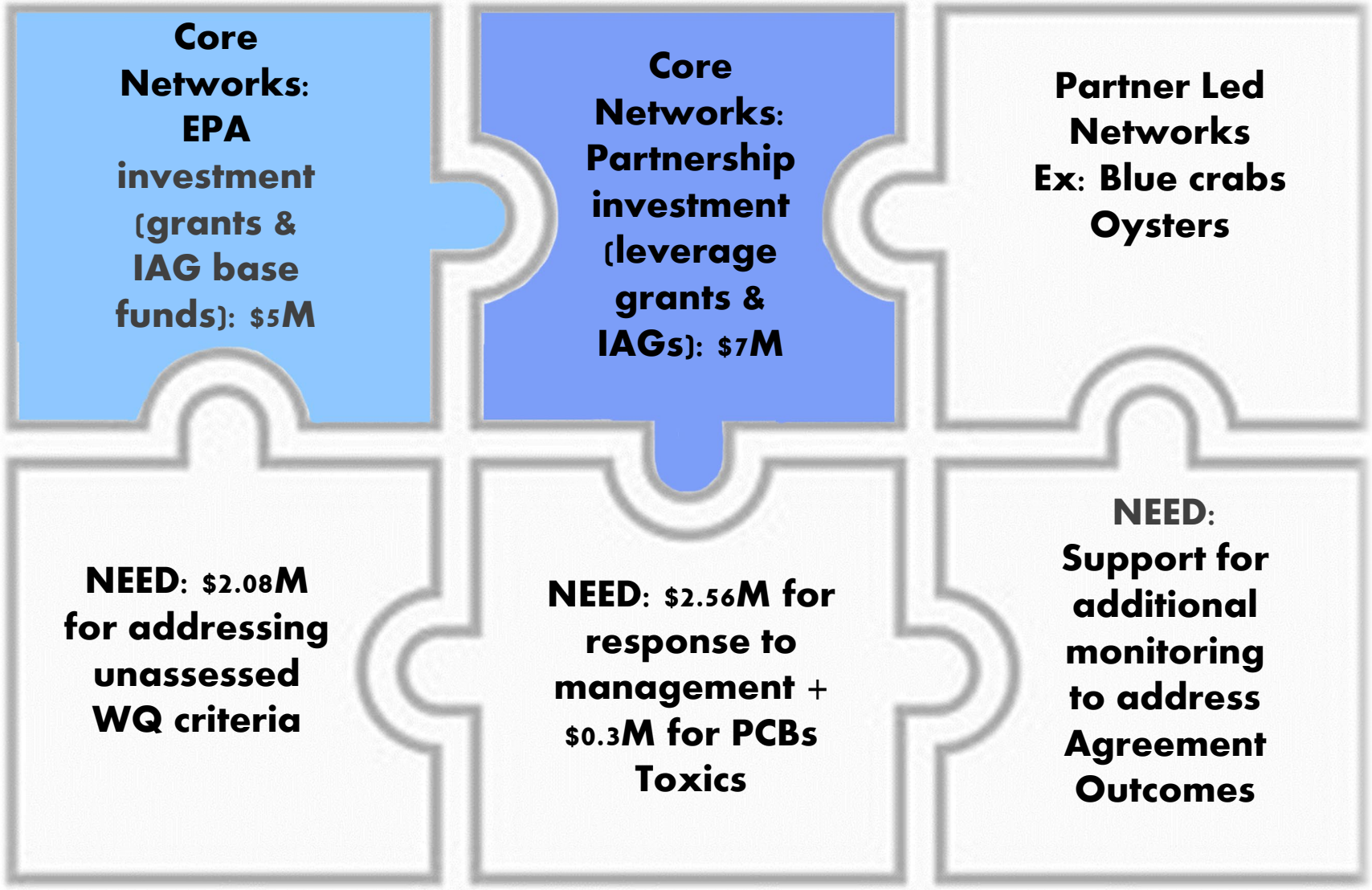
- Investment recommendations and supporting information relate to **3 themes**:
  - Assessing tidal water quality standards to support living resources
  - Evaluate implementation priorities for watershed-based outcomes
  - Document CBP progress toward Watershed Agreement goals and outcomes

Chesapeake Bay Water Quality Standards



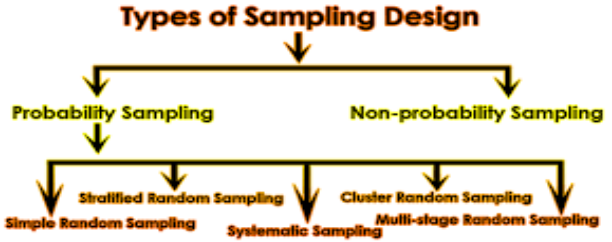
Recommendations based on CBP needs assessment

Core Networks now. More networks to come.



Process of developing recommendations

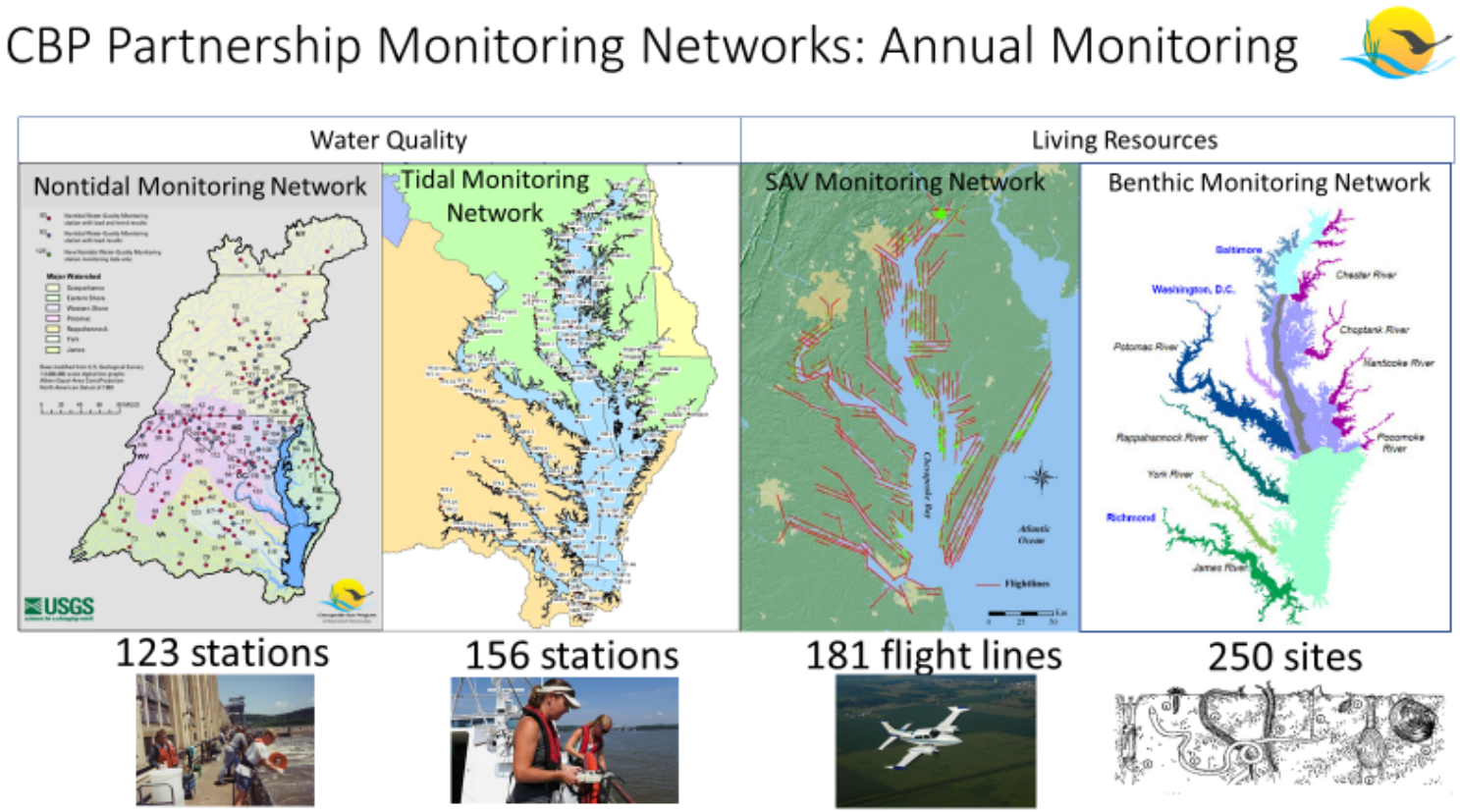
- Needs assessments have been developed and cataloged into the SSRF database
- Groups are developing sampling designs to address data collection needs
- Managers and scientists developed costs for each need based on proposed designs
- Cost estimates were collated and summed



COST MANAGEMENT CATEGORY	Year 1
Salaries and Wages (Data management, regression development)	$21,520
Salaries and Wages (Installation of QW sondes)	$ 21,300
Equipment and Installation Supplies	$105,000

Total cost: $5.1M

Report Section 1: Enhancing CBP Networks



Network Portfolios:

Detail 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.

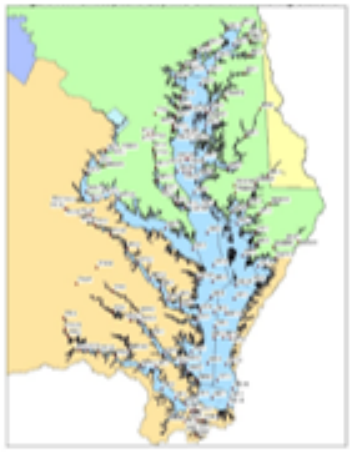


Figure 1. Tidal Bay Monitoring Program locations

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

CURRENT INVESTMENT:

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

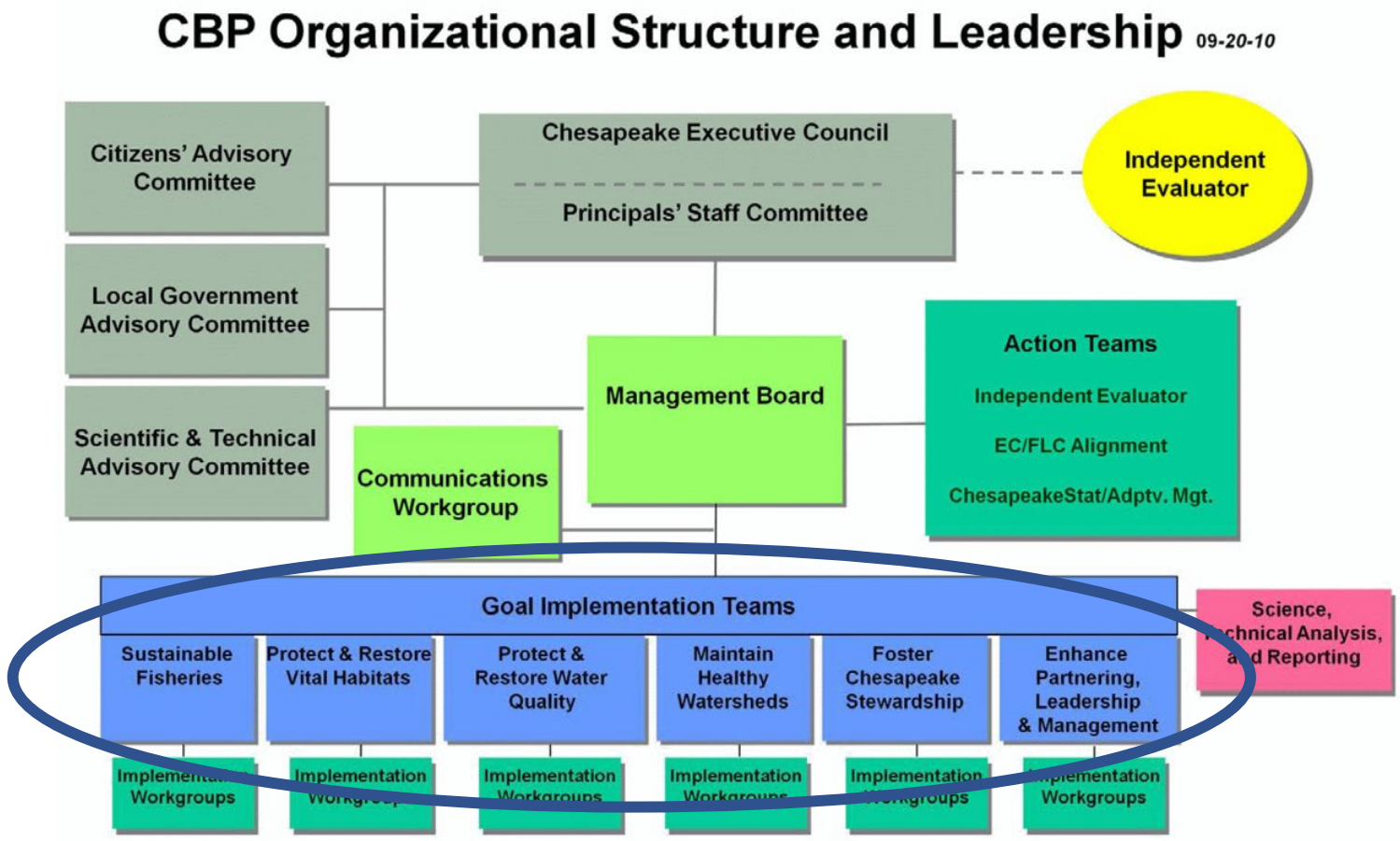
INNOVATIONS:

- 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

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

Report 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 new needs are more constructed and have cost estimates to support them.

Report Section 3: Building Monitoring Capacity

Building Monitoring Capacity

- Need a *multi-partner approach* to invest in gaps.
- Partners can identify which monitoring items they want to support
- Example: Hypoxia collaborative

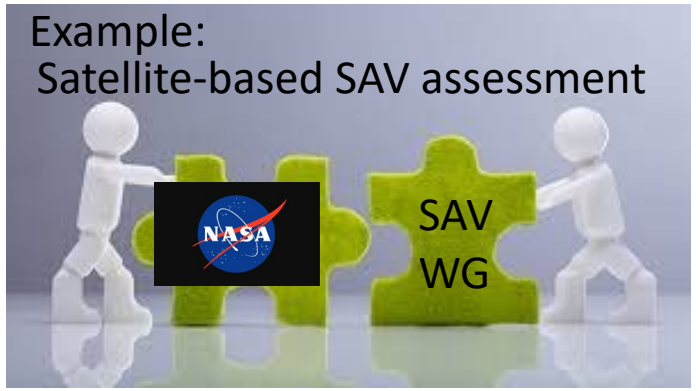
Identify recommendations from the menu to invest in to grow CBP monitoring capacity!

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	$364,652
Funder							
Nontidal	Equipment and supplies for 7 advanced continuous water quality monitoring stations at RIM stations	Infrastructure	$455,000				
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							

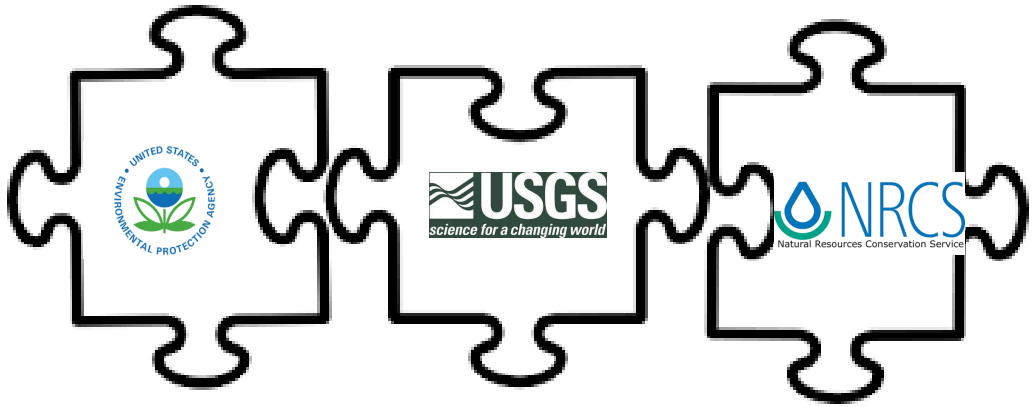
Example: A Partnership approach to turn red funding needs into GREEN collaborations might start to look like this!

CBP NETWORK	RECOMMENDATION	CATEGORY	FUNDING ESTIMATES				
			Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Tidal	Equipment and Supplies for 8 advanced vertical profile stations.	Infrastructure	$600,000				
Funder			EPA / NOAA				
Tidal	Support operation and maintenance of vertical profiles.	Operation & Maintenance	$300,000	$315,000	$330,750	$347,288	$364,652
Funder			NOAA	NOAA	NOAA	NOAA	NOAA
Nontidal	Equipment and supplies for 7 advanced continuous water quality monitoring stations at RIM stations	Infrastructure	$455,000				
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							

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.

For PSC – Next steps

- The report will be shared with the PSC. MB, and CBP once completed.
  - Expected to be the end of March 2022

- **We ask the PSC to:**
  - **Form an action team** that will report out to the PSC on progress and identification of resources to fill needs
  - **Charge the action team** to evaluate, pursue and establish commitments to fund needed monitoring enhancements
  - **Each State and Federal Agency will designate a team member** to represent them on the action team
  - **Appoint STAR as the leader of the action team**

- **Identifying monitoring items for support doesn't commit an agency to provide resources.**
  - We need to have the more in-depth discussions on what are the potential resources
  - Based on these discussions, an agency can decide to move forward (or not) on providing resources

Chesapeake Bay Program

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Thank You!

Questions?

Peter Tango Breck Sullivan, Scott Phillips, Lee McDonnell & Denice Wardrop

Chesapeake Bay Program

Management Board Meeting

February 17, 2022

Supplemental information:

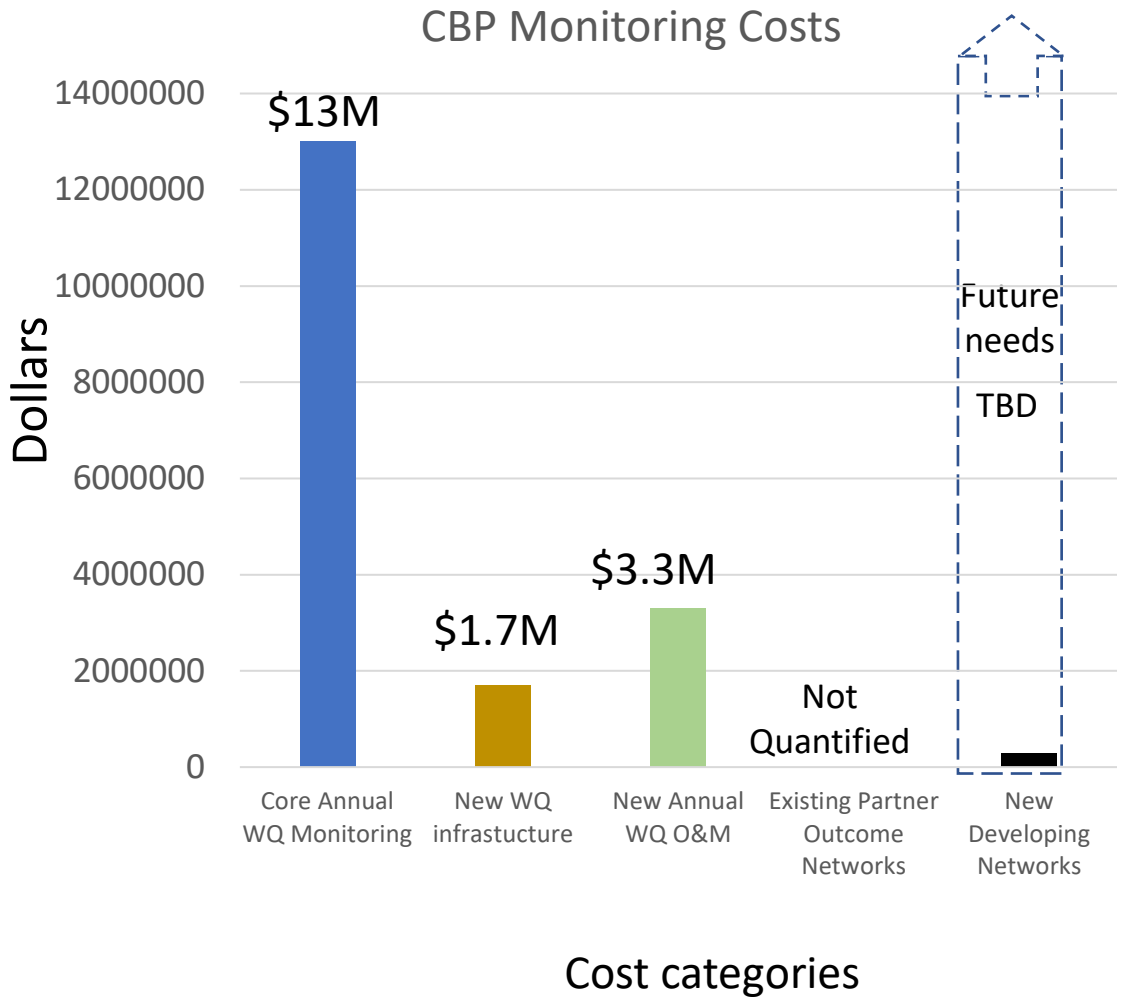
Additional budget-related insights behind the recommendations

Developing Cost Estimates for Investments

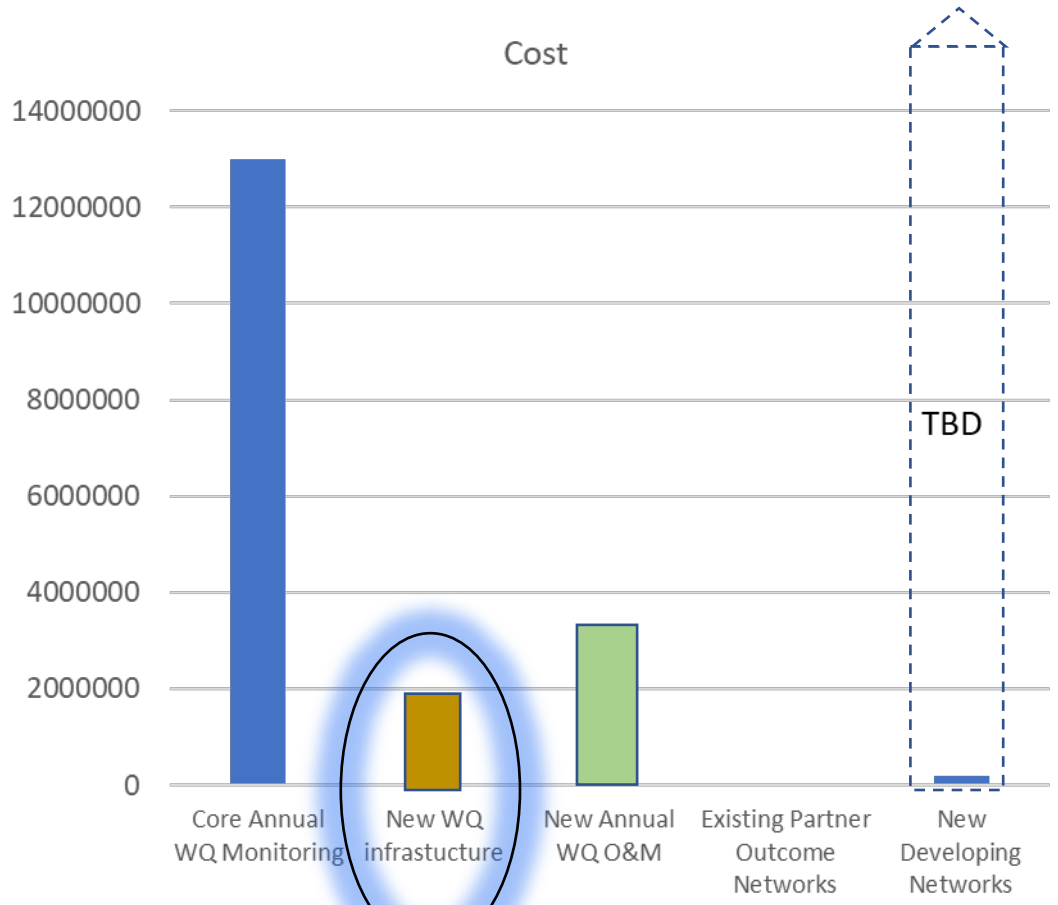
- Initial cost estimates have been developed to enhance core CBP networks
  - Capital (infrastructure) investments: one-time costs for equipment
  - Operation and maintenance: multiyear investments
- Additional costs estimates will be developed for monitoring of all CBP outcomes
  - Coordinating and enhancing existing partner monitoring
  - Establishing new networks
  - Estimates for different networks will come over next year

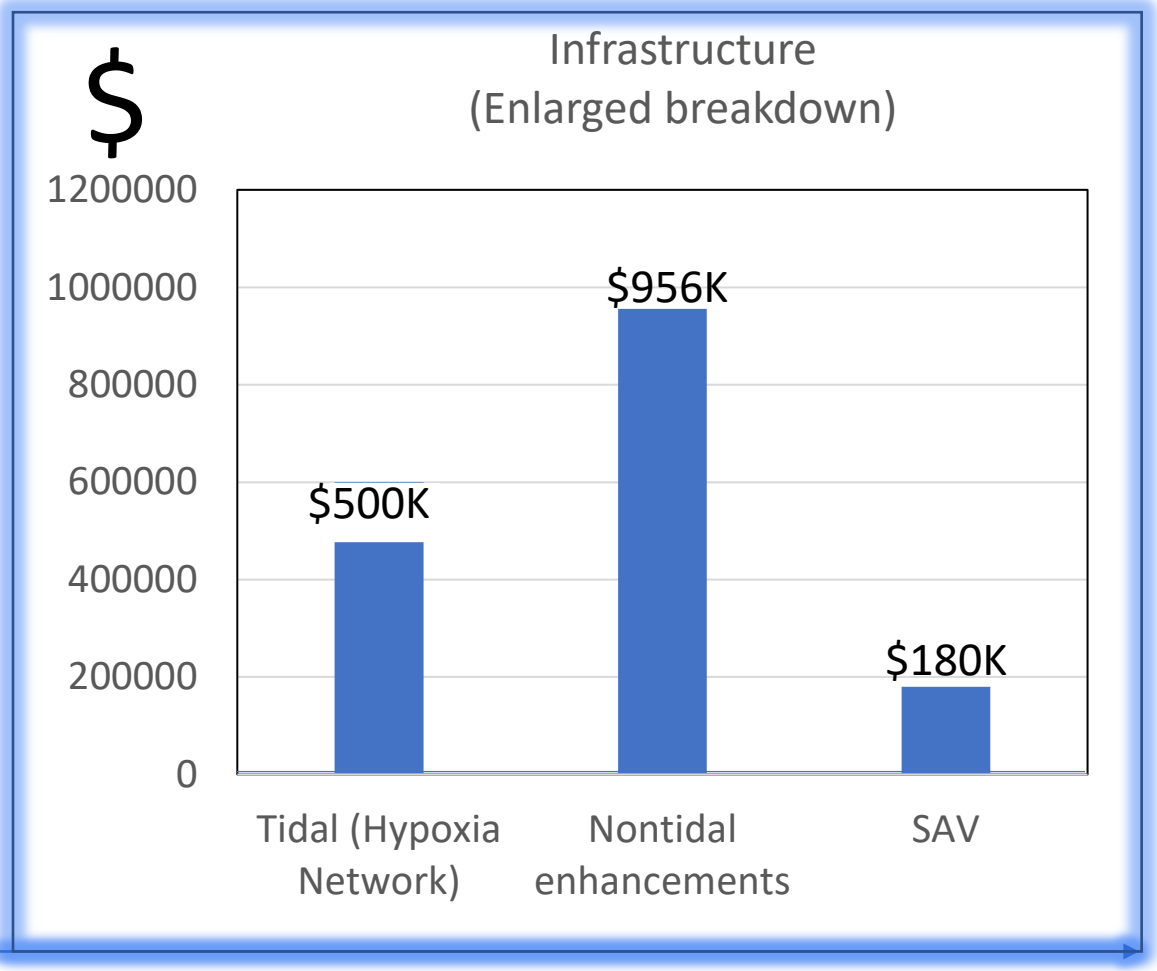
Perspective: Big picture CBP monitoring funding with proposed new cost estimates for expanded monitoring needs

- "Core Annual Water Quality Monitoring Networks" = base funds, and they are:
  - Tidal Nontidal SAV Benthic (tidal)
  - Community Science Land Use Land Cover
- "New WQ Infrastructure" costs
  - derived from this monitoring review
- "New WQ Annual O&M" – annual costs
  - derived from this monitoring review
- "Existing Partner Outcome networks
  - not quantified for this review ($ Millions)
  - e.g. oysters, crabs, fish passage
- "New Developing Networks"
  - outcomes still working on their needs

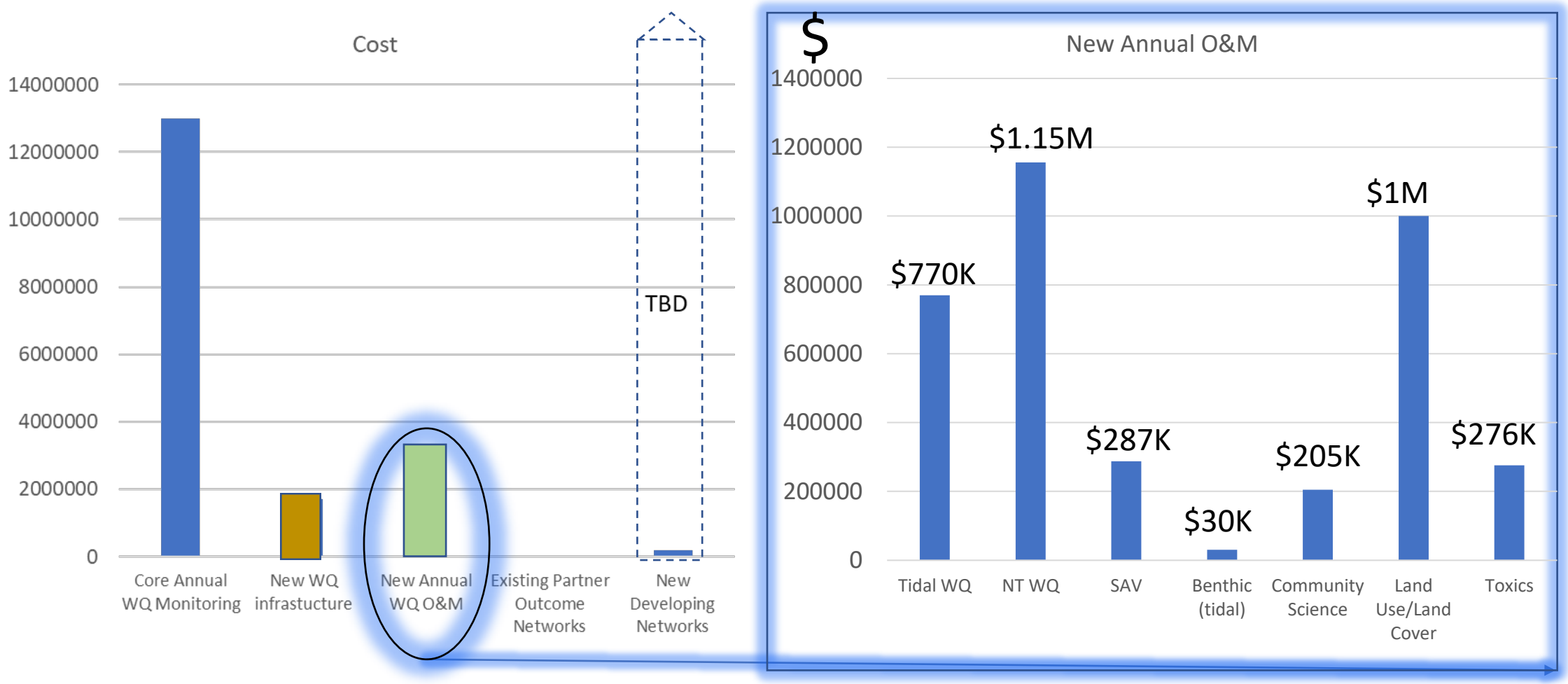


Breakout: Estimated new infrastructure investment needs are $1.7Million



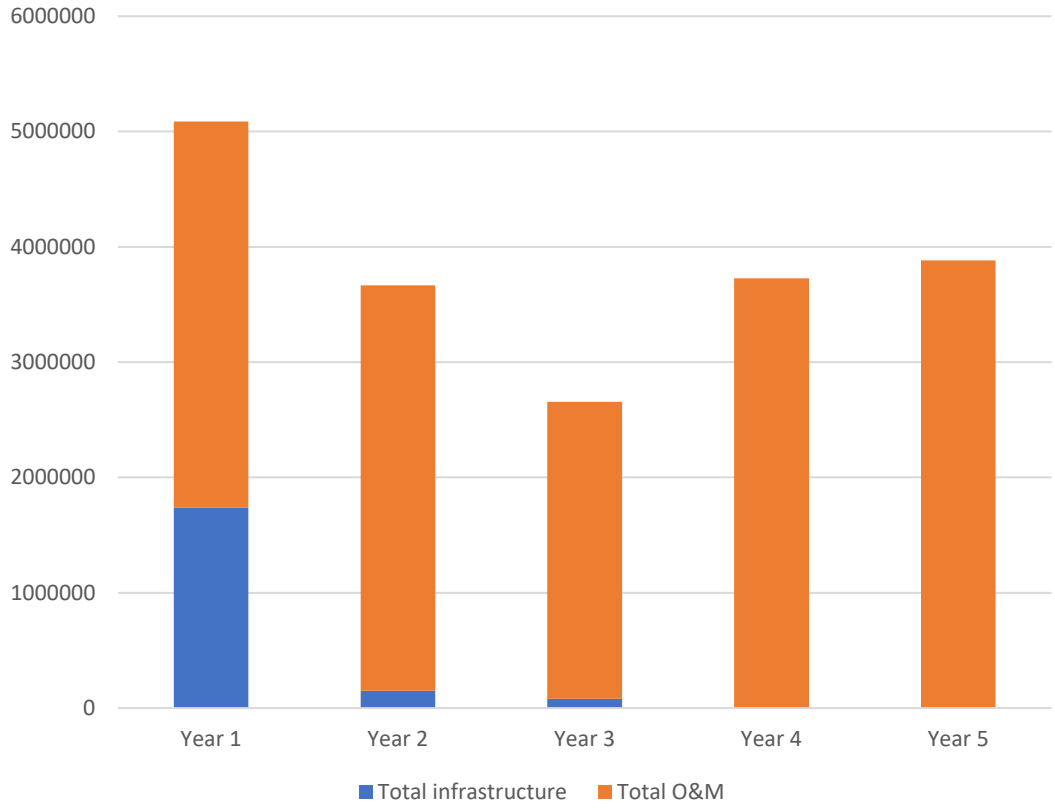


Breakout: Estimated new annual O&M investment needs are $3.3 Million



Monitoring funding – Timeline

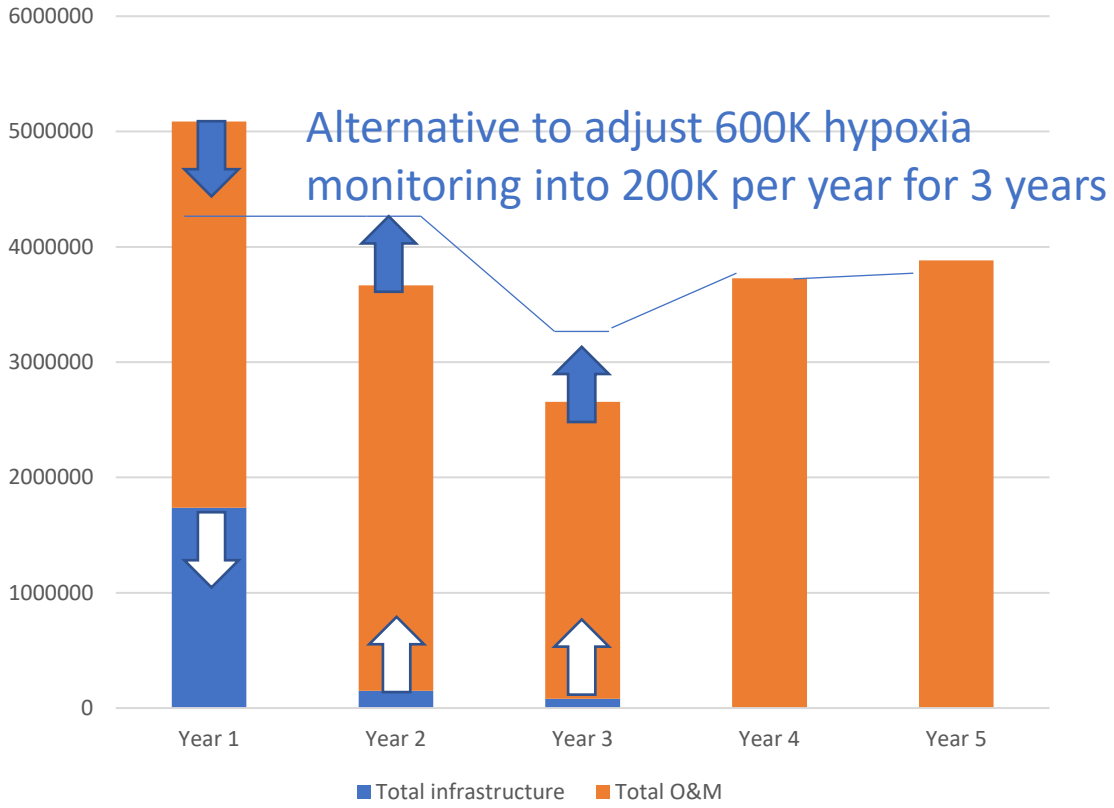
- 5 year timeline
- Infrastructure costs launch program updates focused on year 1
- Subsequent years focus on Operations and Maintenance



Monitoring funding – Can we alter the shape and path of the investments? Sure!

- 5 year timeline
- Infrastructure costs have *some* flexibility on when may occur
- We can adjust some projections into year 2,3,4 program updates now focused on year 1

- Example provided here for shifting part of the year 1 infrastructure investments into years 2 & 3
  - There are other elements that could shift a year or two



Report Overview: Supporting information behind developing the monitoring recommendations

- **Executive Summary**
- **Section 1**: Details behind the specific network recommendations and funding estimates
  - Enhancing existing networks to meet water quality and selected CBP outcomes
- **Section 2**: Overview of monitoring needs and priorities
  - All Watershed Agreement Goals and Outcomes
- **Section 3**: An integrated Partnership approach
  - Building out the monitoring capacity
- **Appendix**: Background information
  - Summary responses to the original 8 questions about the networks gathered from the 9 month review meetings with CBP workgroups and GITs